10 Non-Residential Services (Commercial, Industrial, and Agricultural)

This section describes Power Company requirements for non-residential services. This section covers single-phase and three-phase services for direct-connect and transformer rated sockets for meters. All non-residential customers are responsible for coordinating service requirements with the Power Company prior to material purchase and installation.

Any exceptions to the metering requirements must be approved in writing by the Power Company prior to installation.

10.1 Service Point Location for Meter and Equipment

The service point for non-residential customers refers to the location where the Power Company's circuit connects to the customer's system. Meters and metering equipment shall be located outdoors. If prior written approval to locate the meters and/or metering equipment indoors (in a meter room) is granted by the Power Company, the meter and equipment shall be installed at the main level or entry floor of the customer's building. Meter rooms should be located on the side of the building that is closest to the distribution transformer.

The Power Company requires a ground floor location for the termination of load-carrying conductors and meters. Entry doors to service equipment rooms which contain Power Company metering or termination equipment shall open outward and shall be accessible from the outside, fitted with a Power Company-supplied lock box for Power Company use.

Meters shall not be installed on a drive-through service entrance side of a non-residential building.

When vehicles or other equipment may be near Power Company equipment, barrier posts are required (see Figure 6.4.4). The customer is responsible for providing barrier posts for the protection of electrical equipment.

Refer to Section 5 for additional clearance and location information.

10.2 General Descriptions

Direct Connect Services (120 to 480 volts) are:

(a) Single-phase services of 400 amps or less (320 amps continuous).
(b) Three-phase services of 200 amps or less (160 amps continuous).

Instrument Rated Services (120 to 480 volts) require current transformer metering and are:

(a) Single-phase services over 400 amps (320 amps continuous).
(b) Three-phase services over 200 amps (160 amps continuous).

Secondary Voltage Switchboard Metering (120 to 480 volts) is required whenever a service exceeds 800 amps.

Primary Services are services with delivery voltages greater than 600 volts.

Test Block Facility (TBF) is a manual-link bypass.

10.3 Direct Connect Services

The Power Company requires a direct-connect meter socket when the ampacity of a single-phase service entrance is 400 amps (320 amps continuous) or less, or when the ampacity of a three-phase service is 200 amps (160 amps continuous) or less.

Meter sockets for direct-connect services shall be furnished, installed, and wired by the customer. Required types are summarized in Table 10.3. Typical socket connections are shown in Figures 10.3.5 and 10.3.6.

Non-Residential, Direct-Connect Socket Requirements:

1. All meter sockets shall be EUSERC-approved.
2. All meter sockets shall be ring-type.
3. All meter sockets shall be furnished with screw-type sealing rings
4. All meter sockets (other than the type described in number 8 below) shall have manual link bypasses. This maintains service to the customer while the meter is removed for testing, inspection or other required work.
5. All three-phase meter sockets shall have safety sockets.
6. All 480-volt single-phase meter sockets shall have safety sockets.
7. Safety sockets are approved but not required for single-phase 120/240-volt meter sockets.
8. Manual link bypasses are recommended but not required for single phase, 120/240 volt, services of 100 amps or less that serve government-owned sprinkler systems

Refer to the Power Company Meter Socket List for specific manufacturer approved socket types. This list is located on the internet at *www.pacificpower.net/metersockets* and *www.utahpower.net/metersockets.*

The following table summarizes the socket requirements for new construction.

Table 10.3 - Non-Residential, Direct-Connect Socket Requirements

Voltage	#Wires	Phase	Amps	No. of Terminals	Manual Link Bypass Required?	Safety Socket Required?	EUSERC No.
120/240	3	1	0–100 Overhead 0–100 Underground	4	Yes	No	304, B-Line U264 or equal
120/240	3	1	0–200 Overhead	4	Yes	No	305, B-Line U264 or equal
120/240	3	1	101–200 Underground	4	Yes	No	305, or B-Line U264 with a junction box*, or equal
120/240	3	1	201–400 Overhead	4	Yes	N/A	302B
120/240	3	1	201–400 Underground	4	Yes	N/A	B-Line 324C or equal
480	3	1	0–100	4	Yes	Yes	304
480	3	1	101-200	4	Yes	Yes	305
120/208 (Network)	3	1	0–200 Overhead 0–100 Underground	5 (9 o'clock position)	Yes	No	B-Line U264 with a 5th jaw socket kit or equal
120/208 (Network)	3	1	101-200 Underground	5	Yes	No	305, or B-Line U264 with a 5th jaw socket kit and junction box*, or equal
120/208Y 277/480Y 120/240	4	3	0–100	7	Yes	Yes	304
120/208Y 277/480Y 120/240	4	3	101–200	7	Yes	Yes	305
120/208Y 277/480Y 120/240	4	3	Greater than 200	*Not approved for direct-connect installations. Requires instrument-rated metering.*			

* See the junction box requirements in the following section.

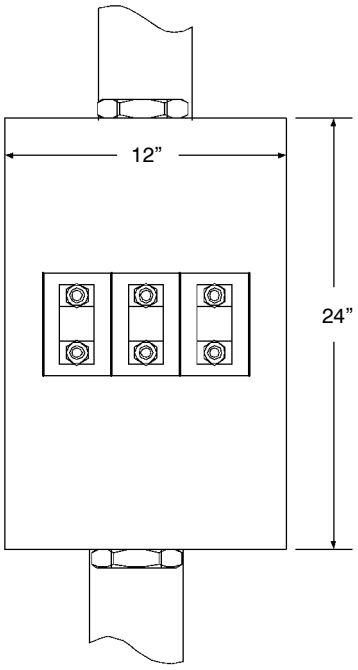
Note: If replacing the socket of an existing three-phase, direct-connect, 3-wire service, a EUSERC 7-jaw safety socket configured for a three-phase, 3-wire meter is required (see EUSERC 304/305, Note 12). This type of service is not approved for new construction.

10.3.1 Sealable Junction Box

The junction box provides a means of terminating the utility's service conductors when required. The customer is responsible for providing the junction box, connectors and connections from the junction box to the line side of the metering equipment.

The junction box must be NEMA 3R rated, and must have sealing provisions.

Figure 10.3.1 – Sealable Junction Box with Distribution Blocks

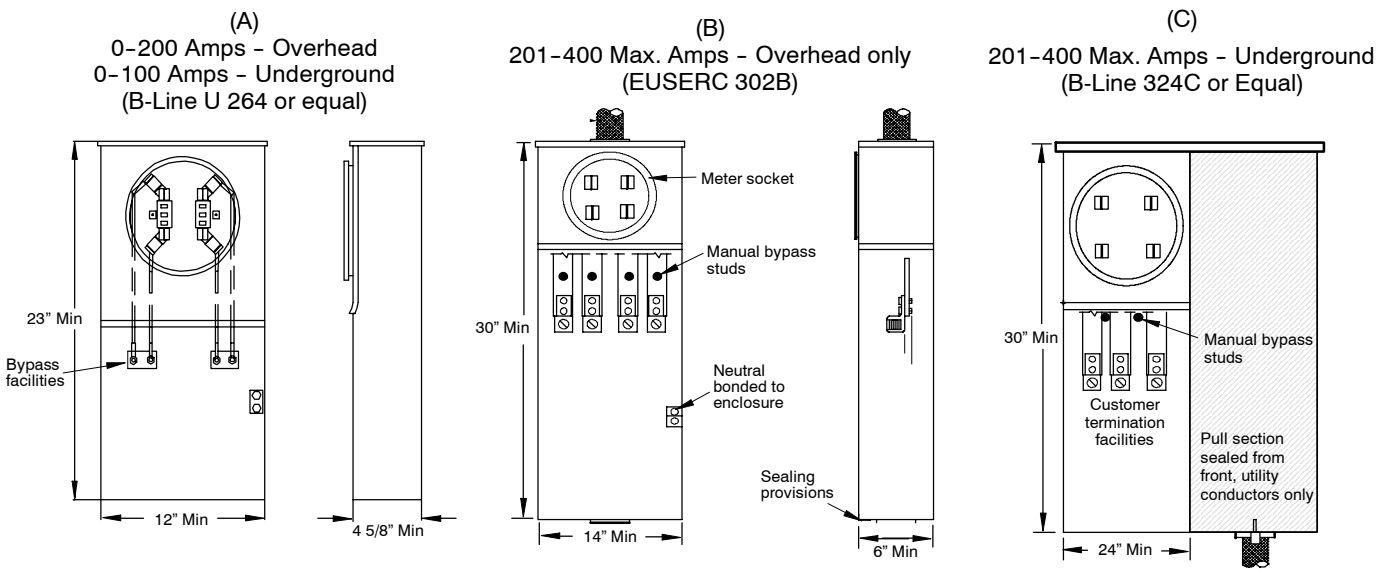


See Table 10.3.1 for junction box depth.

Table 10.3.1 – Junction Box Depths

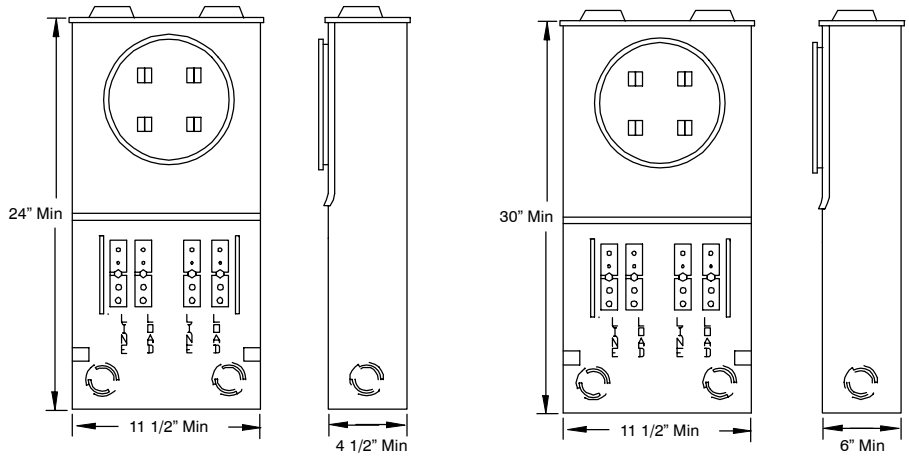
Conduit Size	Junction Box Depth
2 $^{1}/_{2}$-inch or less	4 $^{5}/_{8}$ inches
3-inch	6 inches
4-inch and greater	Consult Power Company

Figure 10.3.2 – Non-Residential Single-phase, Direct-Connect Sockets with Required Manual-Link Bypass



Note: For 101–200 amp underground, and other options, see Table 10.3.

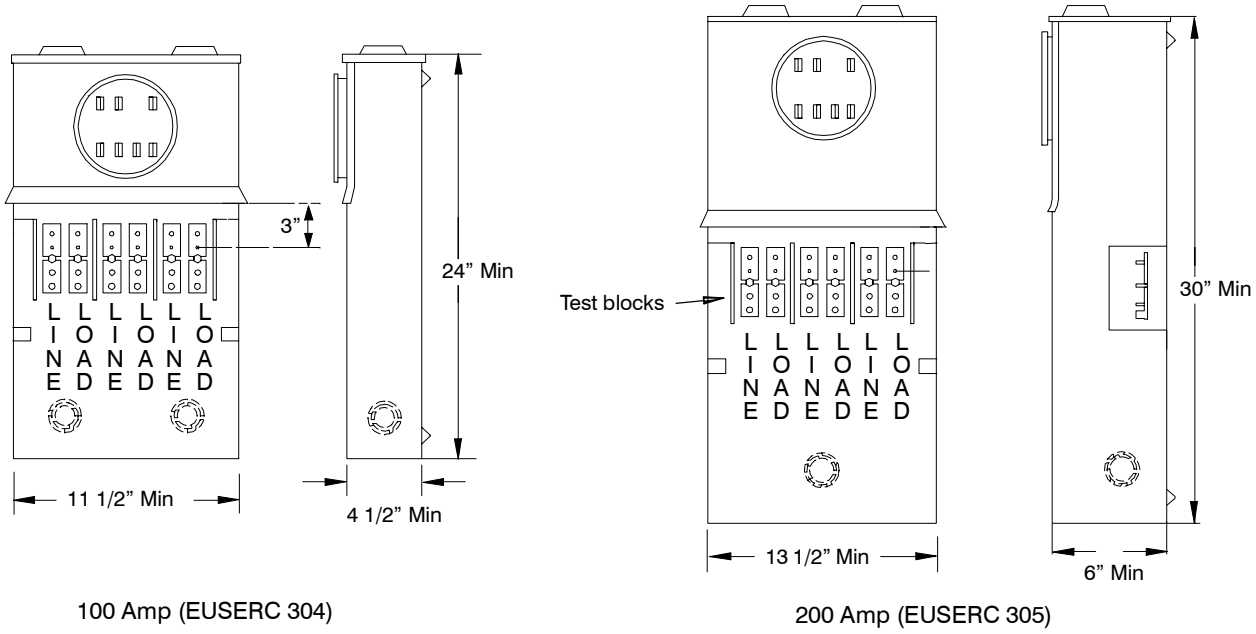
Figure 10.3.3 – Non-Residential Single-phase, Direct-Connect Socket for 480-Volt Services, with Required Safety Socket



100 Amp (EUSERC 304)

200 Amp (EUSERC 305)

Figure 10.3.4 – Three-Phase, Direct-Connect Socket with Required Safety Socket



100 Amp (EUSERC 304)

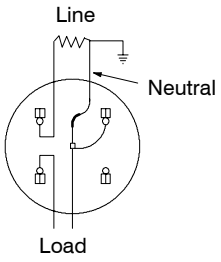
200 Amp (EUSERC 305)

Additional Three-Phase Service Requirements:

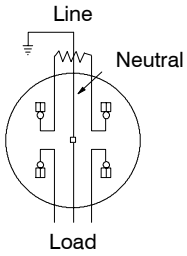
1. For 4-wire delta services, the high leg (power) conductor must be identified by orange marking.
2. A EUSERC-approved safety socket with test blocks is required. This maintains service to the customer if the meter is removed for test or inspection.
3. Three-phase, 400-amp-maximum direct-connect sockets are not approved.

The figures below show typical service connections.

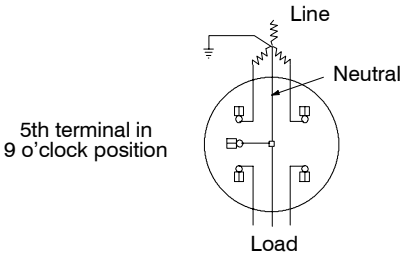
Figure 10.3.5 – Single-Phase Socket Connection Diagram
Front View



120V–2 Wire

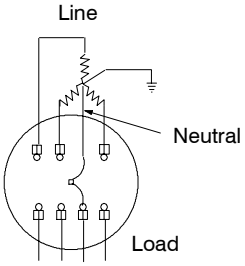


120/240V–3 Wire

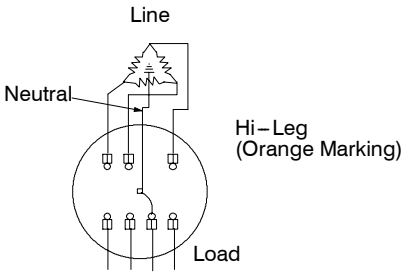


120/208V–3 Wire WYE
Network Meter

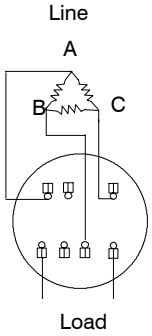
Figure 10.3.6 – Three-Phase Socket Connection Diagram
Front View



120/208V–4 Wire WYE
277/480V–4 Wire WYE



120/240V–4 Wire Delta



240 or 480V, 3-Wire Delta
(Not for new construction)
Configured per EUSERC 304/305 Note 12

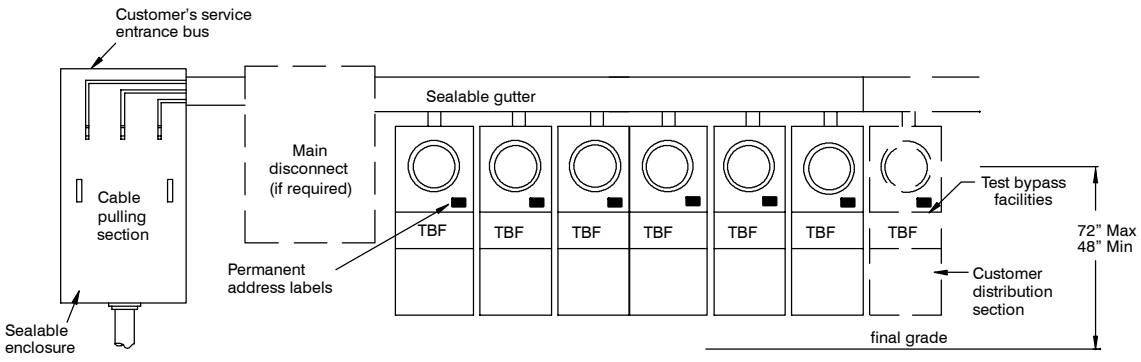
10.4 Direct-Connect Multiple Metering Services

This section describes the additional requirements for direct-connect, non-residential, single-phase and three-phase installations with more than one metered service. The three styles of metering socket equipment approved for use are ganged, modular, and switchboard.

Requirements:

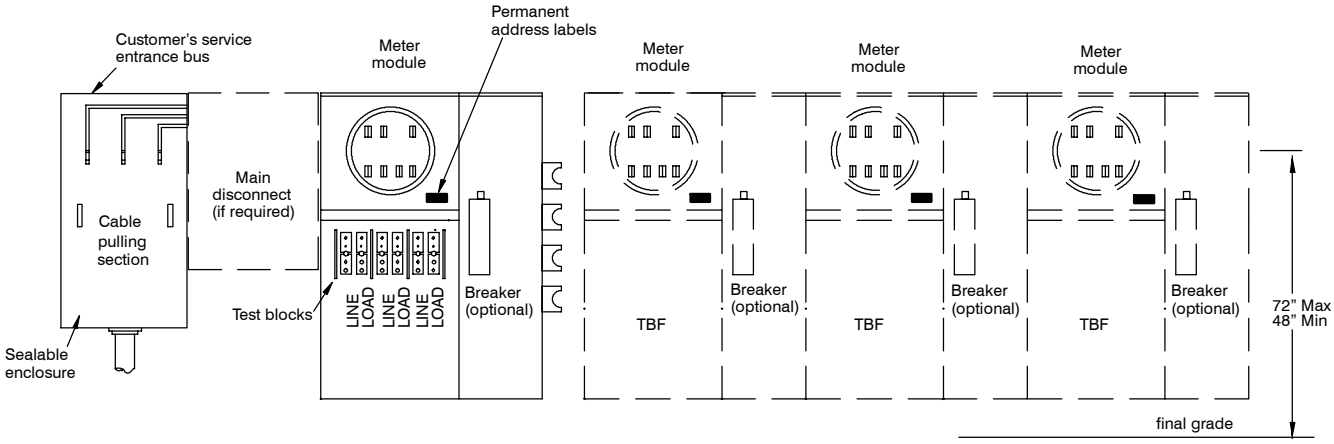
1. Each metered service must have a permanently engraved metal or hard plastic label to identify the customer's address. The label must be permanently attached to the top half of the meter enclosure. The service will not be energized until the label is permanently attached.
2. Vacant meter positions shall be factory sealed, or the meter shall be in position before the panel is energized.
3. All removable panels and covers to compartments used for metering shall be sealable.
4. Metering conductors shall not pass through adjacent metering compartments except in enclosed wireways.
5. A test block facility (TBF) with rigid insulating barriers shall be furnished, installed, and wired or bussed to the meter sockets. TBF cover panels shall be sealable and fitted with a lifting handle.
6. NEC requires a main disconnect when more than six services are connected. If an existing installation expands beyond six services , a main disconnect shall be installed.
7. When the sum of distribution section ampacities exceeds the pulling section ampacities, the customer is responsible for providing NEC-approved load calculations as requested.
8. The cable pulling (pull box) section is required and must be sized for the Power Company service termination (EUSERC 343). Refer to section 10.5 for more details pertaining to the pull box.

Figure 10.4.1 – Non-Residential Ganged Meter Socket Installation



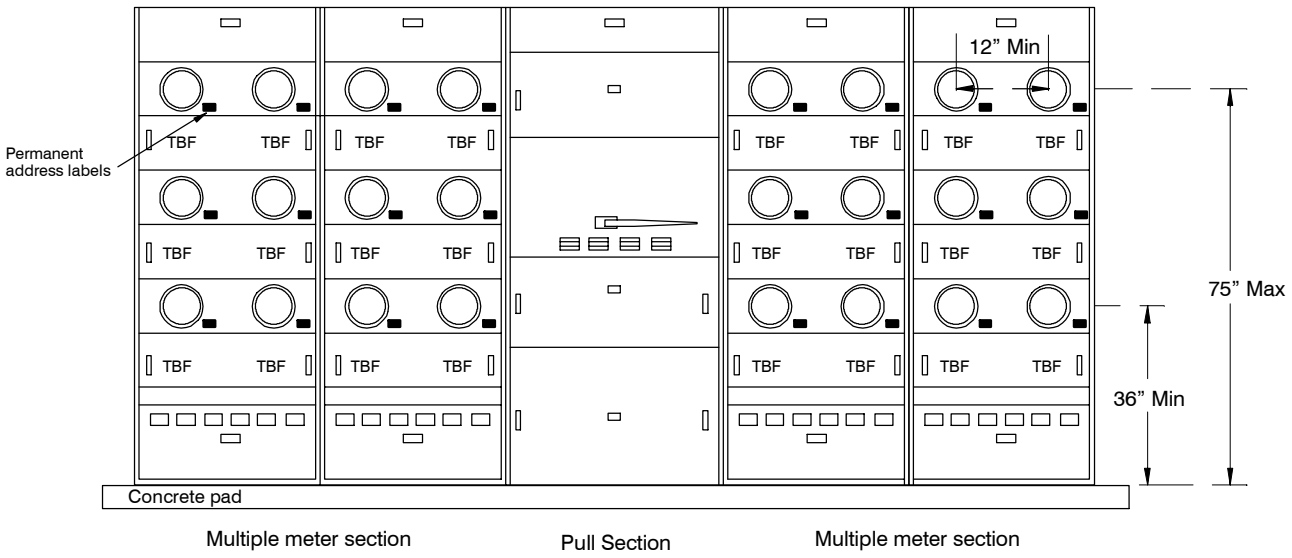
Note: A single-phase configuration is approved.

Figure 10.4.2 - Non-Residential Module Meter Socket Installation



Note: A single-phase configuration is approved.

Figure 10.4.3 - Non-Residential Switch Board Metering
(Direct-connect, Floor Mounted)
EUSERC 306



Notes:

a. The customer must provide a concrete pad for switchboard metering service sections and pull boxes.

b. A single-phase configuration is acceptable.

10.5 Pull Box

This section illustrates and lists pull box requirements as follows:

Requirements:

1. The termination pull box for Power Company conductors shall meet the requirements of EUSERC 343, 343A, or 347.
2. The cable pulling section shall be sized for the Power Company service termination and shall meet the requirements of EUSERC 343.
3. When the sum of the distribution section ampacities exceeds the pulling section ampacities, the customer is responsible for providing Engineering-approved or NEC-based load calculations as requested.
4. The customer shall provide an approved method by which to make multiple taps.
5. Customer-owned devices (such as limiters, fuses, etc.) shall not be installed in pull boxes.
6. The customer shall supply all terminal blocks.

Figure 10.5 – Pull Box
0–600 Volts, 0–1200 Amps
EUSERC 343, 343A & 347

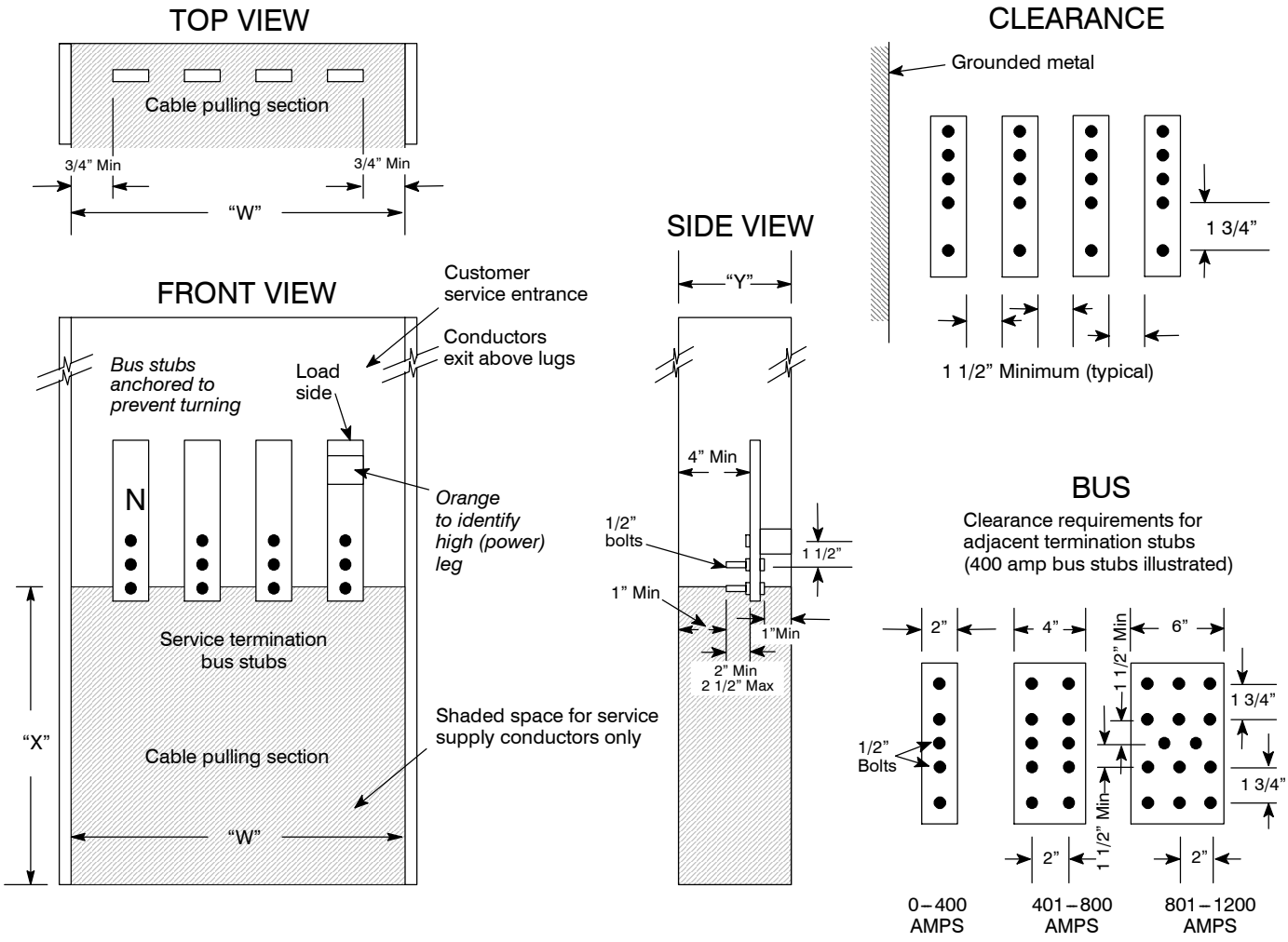


Table 10.5 – Minimum Pull Box Dimensions
(Applies to the Power Company Portion of the Pull Box)

Total Service Amps	"W"		"Y"	"X"
	3 Wire	4 Wire	Depth	Lug Height
0–200	10 1/2"	14"	6"	11"
201–400	10 1/2"	14"	6"	22"
401–800	16 1/2"	22"	11"	26"
801–1200	22 1/2"	30"	11"	26"

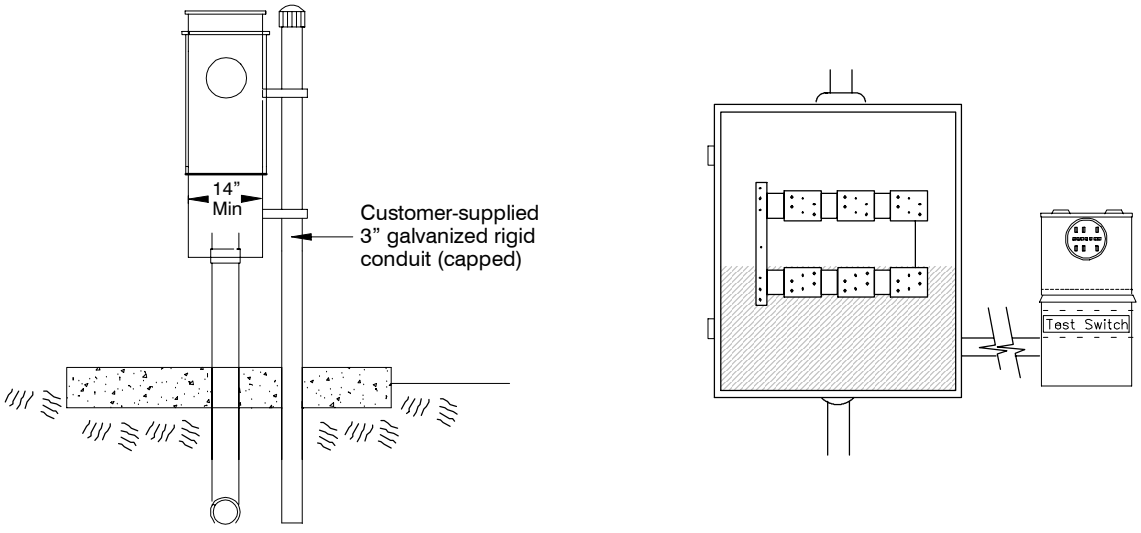
10.6 Current Transformer Metering – 600 Volts, 800 Amps Maximum

Current transformer (CT) metering is required when a three-phase service exceeds 200 amperes (160 amps continuous), or when a single-phase service exceeds 400 amperes (320 amps continuous). For services over 800 amps, see Section 10.12, *Switchboard Metering* (also approved for smaller loads).

Two types of CT mounting configurations are approved by the Power Company:

(a) Current Transformer Metering, Post-Mounted.
(b) Current Transformer Metering, Wall-Mounted

Figure 10.6.1 – Current Transformer Metering Mounting Configurations



(A) POST–MOUNTED, SIDE VIEW (B) WALL–MOUNTED

The CT cabinet and meter shall be mounted outside the building as approved by the Power Company. Where metering equipment is installed in a location susceptible to being struck by a vehicle, the customer shall install and maintain barrier posts approved by the Power Company (see Figure 6.4.4).

The customer shall provide and install:

1. A EUSERC-approved meter socket enclosure. The socket shall be mounted plumb in both directions, drilled and tapped for a Power Company meter test switch.
2. A current transformer cabinet. The cabinet must be a weather-tight, NEMA 3R-rated, metallic cabinet securely mounted on a rigid surface. The door shall be hinged and capable of being sealed. The cabinet shall be sized in accordance with Table 10.6.2, *Current Transformer Cabinet Requirements,* and shall be in compliance with EUSERC.
3. A EUSERC-approved current transformer mounting base (Refer to Section 10.6.3 for details). All mounting bases shall be rated for 50,000-amp fault duty. Cable termination can only be made on the manufacturer-supplied studs/connectors of the transformer mounting base. No alteration of the transformer mounting base is allowed.
4. The conduit between the meter socket enclosure and the current transformer cabinet.
5. Connectors terminating the load conductors to the current transformer mounting base.
6. Bonding per Section 10.10 for all meter and CT enclosures.

The customer shall not terminate their principal grounding conductor in the Power Company's sealed termination pull box. The principal grounding conductor is not the Power Company-supplied neutral; it is the customer's grounding conductor.

The Power Company will provide and install:

1. The meter
2. A meter test switch.
3. Instrument current transformers.
4. Instrument voltage transformers.

Note: The customer shall consult the Power Company for specifications on instrument transformers, secondary-side wiring of instrument transformers, and the meter test switch prior to ordering the metering enclosure.

10.6.1 Meter Socket Enclosure

Requirements:

1. All meter socket enclosures shall be EUSERC-approved (see EUSERC 339).
2. All meter socket enclosures shall be ring-type.
3. The meter socket enclosure must be provided with a space reserved below the socket for a Power Company test switch $9\,^1/_2$ inches in length.
4. The meter socket enclosure shall contain a mounting perch, drilled and tapped, for a test switch. The Power Company will furnish and install the test switch.
5. All unused openings must be covered and secured by the customer.
6. Meter socket enclosures with circuit closers or bypass clips are not acceptable.
7. All 48" cabinets must have two sealable, hinged doors with a handle in the center.

Figure 10.6.1 – Meter Socket Enclosure for Current Transformer Meters
EUSERC 339

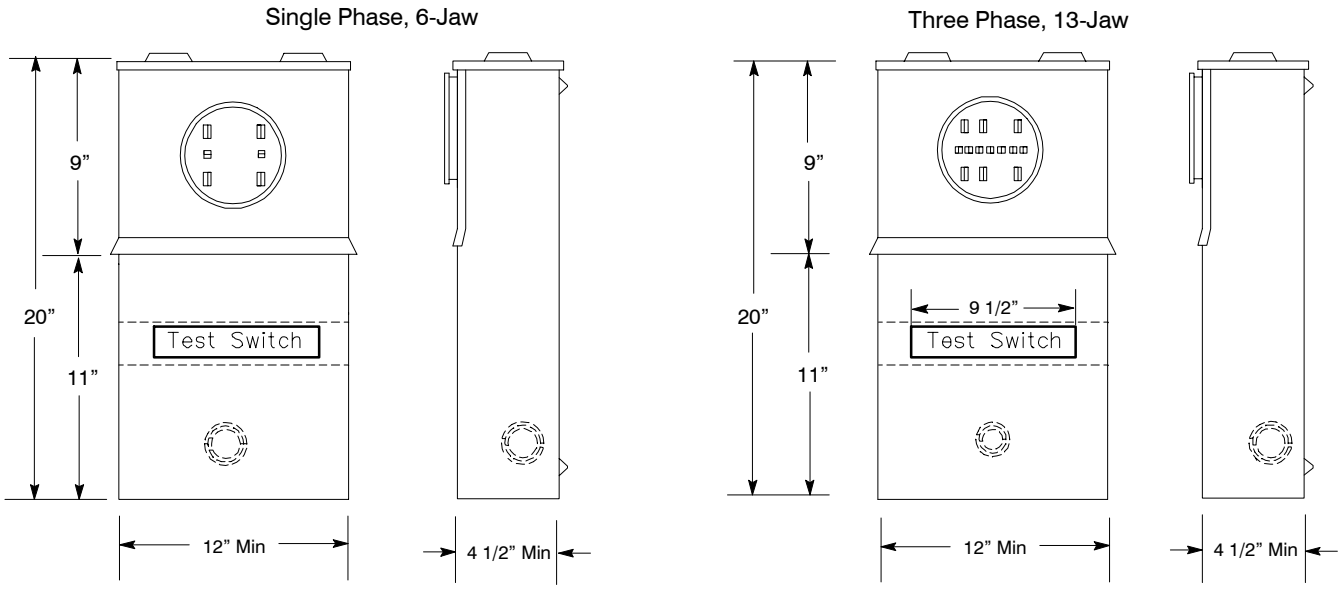


Table 10.6.1 – Current Transformer Meter Socket Types
EUSERC 339

Type of Service	Socket Type
120/240 volt, single-phase, 3 wire	6 jaw
120/208 volt, three-phase, 4 Wire	13 jaw*
277/480 volt, three-phase, 4 Wire	13 jaw*
240/120 volt, three-phase, 4 Wire	13 jaw*

*15 jaw sockets are approved but not required.

10.6.2 Current Transformer Cabinet Requirements

Table 10.6.2 – Current Transformer Cabinet Requirements

Current Transformer Cabinet: Wall- and Post-Mounted Installations					C.T. Mounting Base
Type of Service	C.T. Enclosure	Minimum Cabinet Dimensions			
		Width	Height	Depth	EUSERC #
Single-phase, 3 Wire 400-800 Amps	EUSERC 316	24”	48”	11”	328A, 328B
Three-phase, 4 Wire 201-800 Amps	EUSERC 316	36”	48”	11”	329A, 329B
A larger cabinet is required if both the line and load conductors enter and exit from the bottom of the can.		48”	48”	14”	
Above 800 amps: see Section 10.12, *Switchboard Metering.*					

10.6.3 Transformer Mounting Base Requirements for Installation in a Current Transformer Cabinet

Requirements for the current transformer mounting base for installation in the current transformer cabinet are as follows:

1. The mounting base for CT's shall meet the ratings for the available fault current (50,000A minimum.)
2. For 4-wire delta services, the customer shall identify the high leg (power) conductor with orange marking.
3. The mounting base shall accept bar-type current transformers only.

Cable Termination:

4. Line and load-side terminations on EUSERC 328A or 329A CT landing pads require two bolts per connector. (EUSERC 328B and 329B CT landing pads do not require 2-bolt connectors.)
5. For underground service, the Power Company will provide connectors and terminate the line-side service conductor directly on the current transformer mounting base. The customer needs only to connect the load side. The customer must furnish all lugs and connect conductors to the load terminals.
6. On overhead services, the customer must furnish all lugs and connect conductors to the line and load terminals of the current transformer mounting base. The customer is responsible for bringing the service entrance conductor to the connection of the utility service drop.
7. Cable termination can only be made on the manufacturer-supplied studs of the transformer mounting base. No alteration of the transformer mounting base is allowed.

Figure 10.6.3.1 – Transformer Mounting Base for Installation in a Current Transformer Enclosure
(Single-Phase, Three-Wire, 800-Amp Max. EUSERC 328A, 328B)

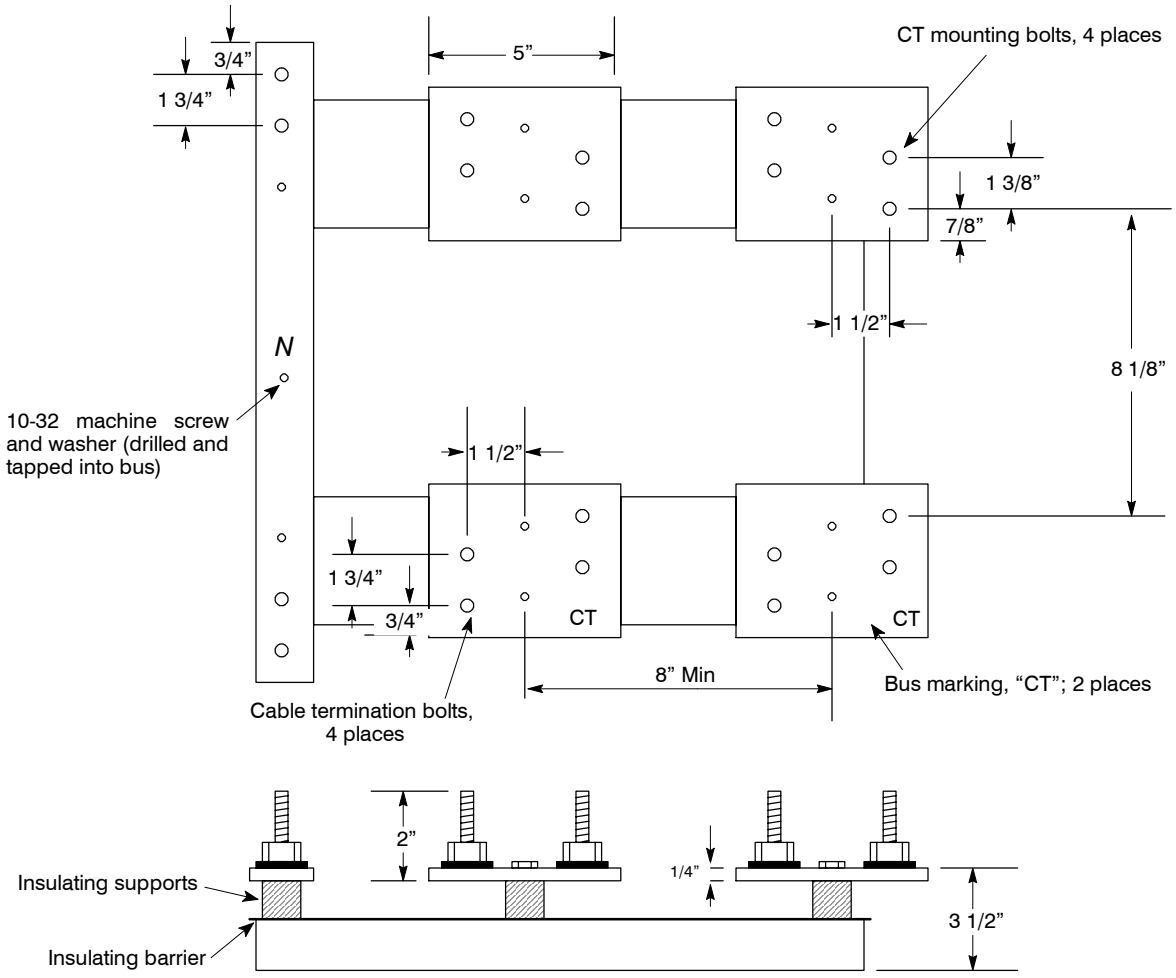
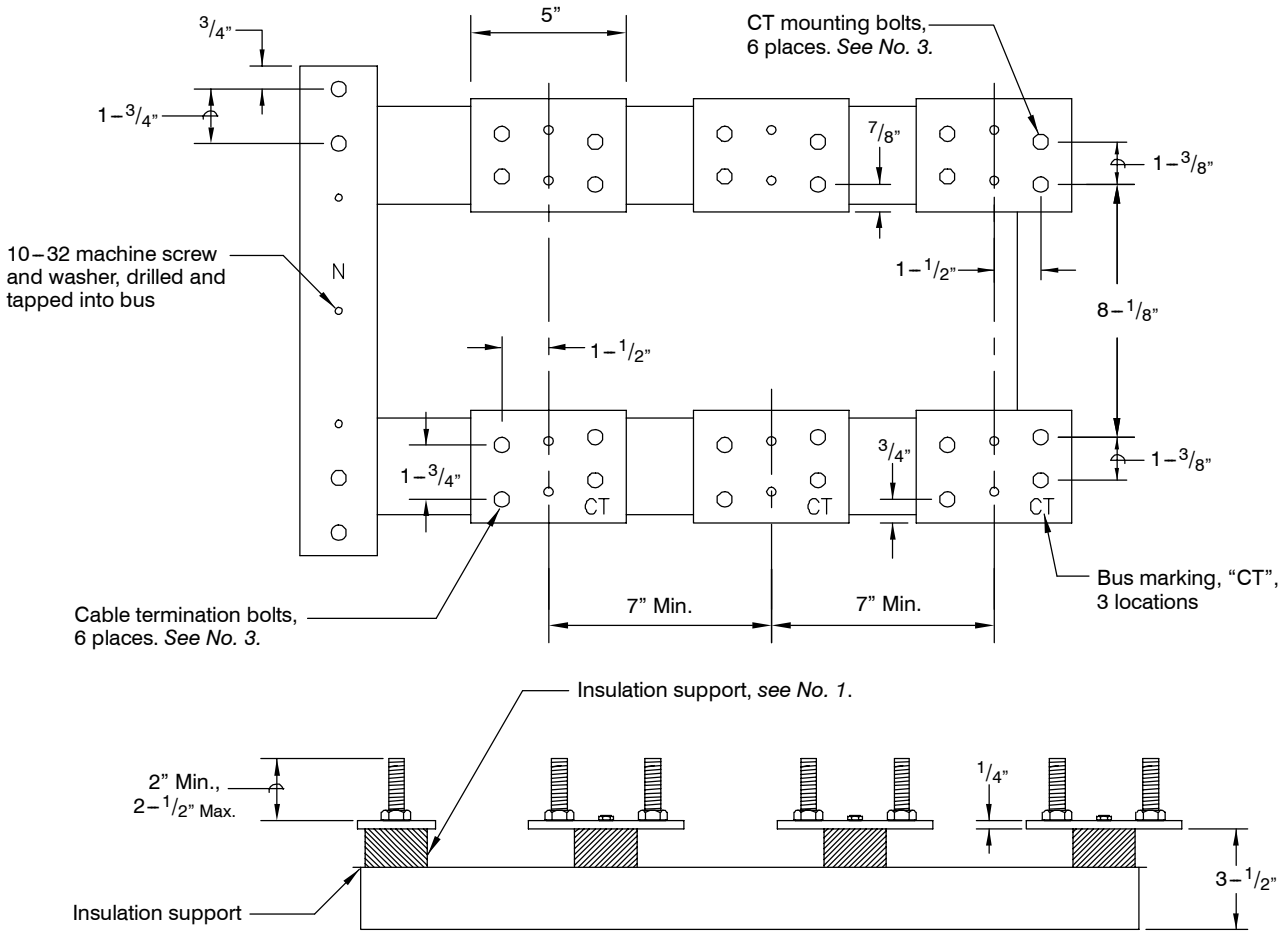


Figure 10.6.3.2 – Transformer Mounting Base for Installation in a Current Transformer Enclosure

(Three-Phase, Four-Wire, 800-Amp Max., EUSERC 329A, 329B)

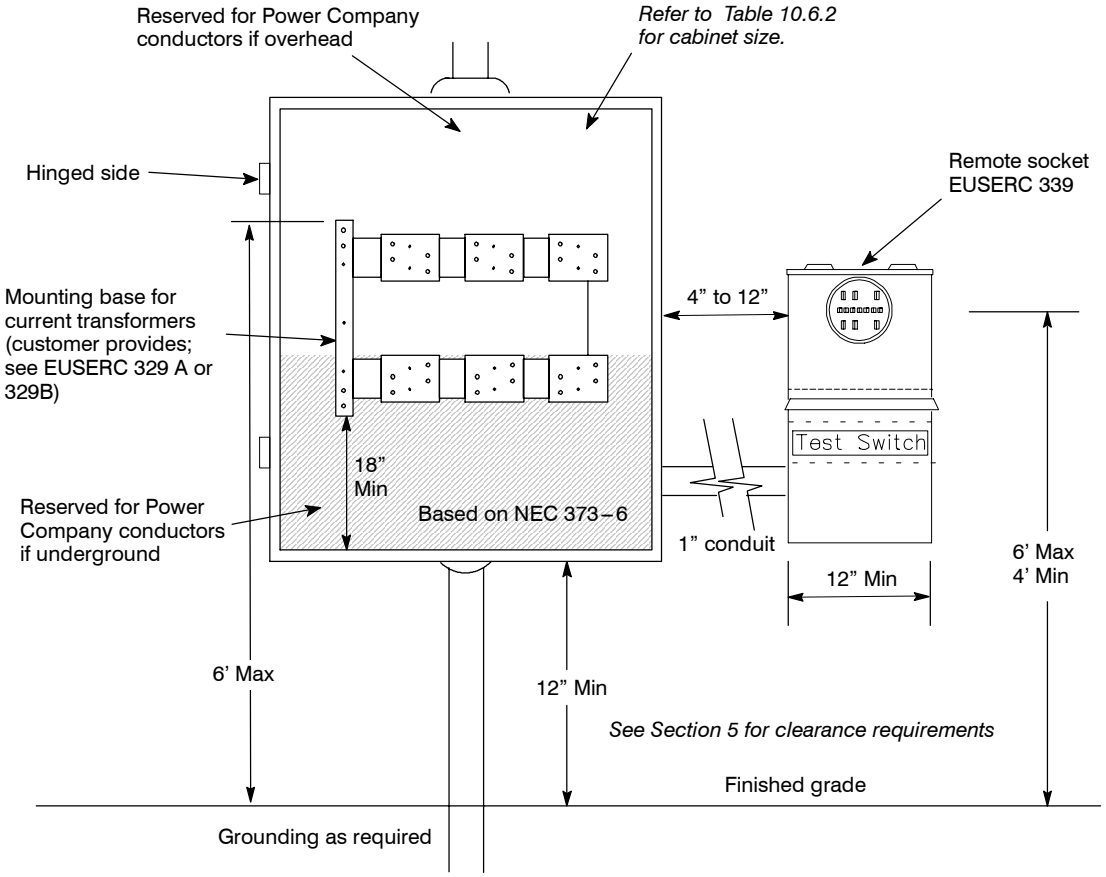


10.6.4 Additional Requirements for Current Transformer Metering, Wall/Post Mounted

1. The customer service entrance conduits must exit the enclosure on the load side of the current transformer.
2. Only conductors and equipment associated with Power Company metering shall be permitted in the current transformer enclosure.
3. The current transformer enclosure must not be used as a load distribution center. For multiple metered circuits, a separate terminating pull box must be provided for the Power Company service lateral. See section 10.5 for pull box requirements.
4. Customer conductors are not permitted in the Power Company's terminating and pull space.
5. Customer conductors shall exit the enclosure on the load side of the current transformers.
6. Meter sockets shall not be located above or below CT enclosures.
7. The top of the CT mounting bracket shall not be more than 6 feet above floor level. The cover shall have factory-installed hinges for side opening, with sealing provisions, and shall hold the cover in the open position at 90 degrees or more.

8. The meter shall be located on the non-hinged side of all current transformer cabinets (except 48” x 48” cabinets). The meter must be mounted such that it will not interfere with the opening of the cabinet doors.
9. The cabinet must have two sealable, hinged doors with a handle in the center for 48” x 48” cabinets. The meter enclosure can be mounted on either side of the 48” x 48” CT cabinet, but not above or below it.
10. Exposed conduit for the Power Company’s service lateral should not extend more than 5’6” (or less than one foot into the building if indoors).
11. Grounding and bonding must be in accordance with current NEC requirements (see Section 10.10). The code enforcing agency may require the ground connection to be visible when electrical inspection is made.
12. Refer to Section 6 for underground conduit requirements.

Figure 10.6.4.1 – Current Transformer Metering, Wall Mounted
Service Below 600 Volts, 800 Amps Max.



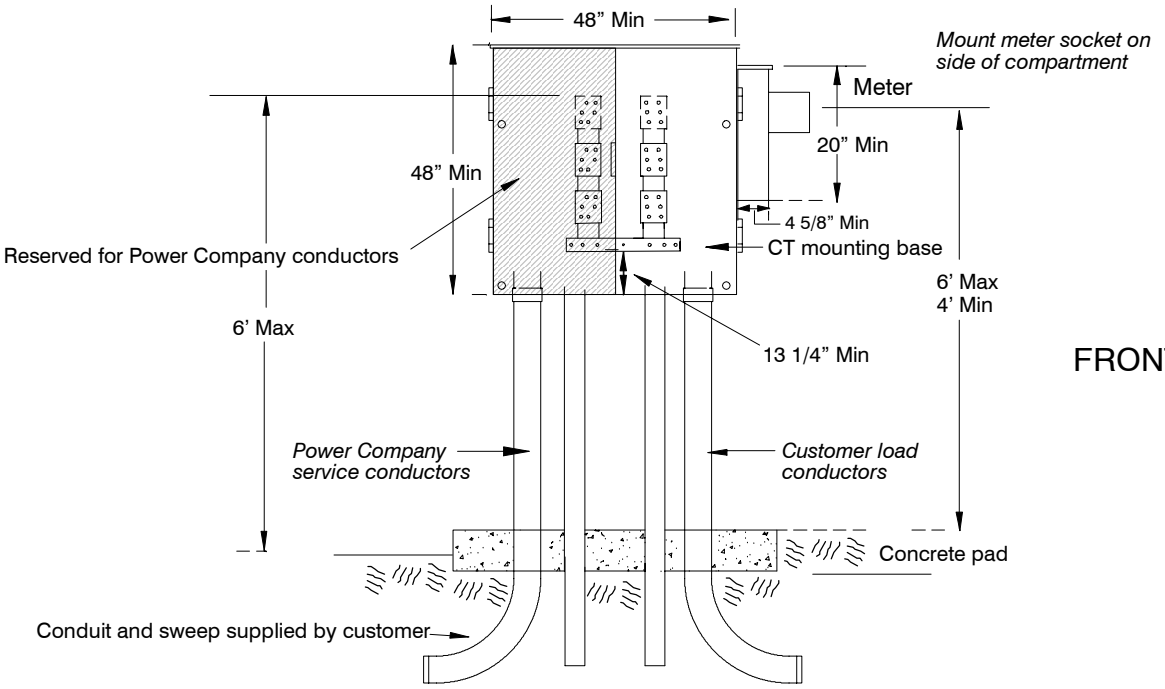
Notes:

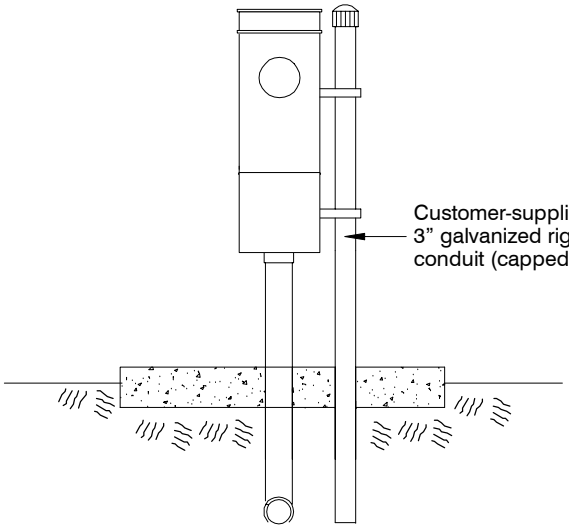
a. This cabinet size may also be post-mounted.

b. A larger cabinet (48" x 48") is required if both the line and load conductors enter and exit from the bottom of the cabinet.

The following figure illustrates the cabinet requirements when the line and load conductors enter and exit from the bottom of the cabinet.

Figure 10.6.4.2 – Current Transformer Metering, Post Mounted
Service Below 600 Volts, 800 Amps Max.



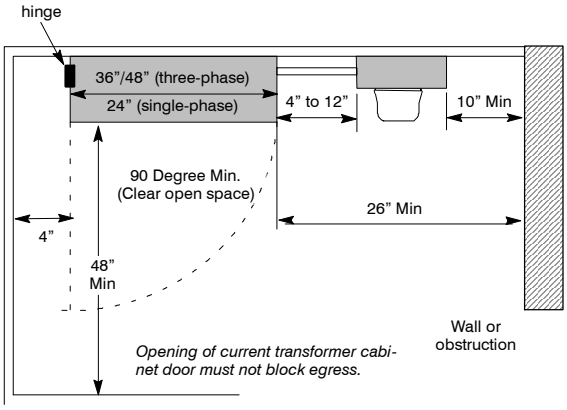


Note: This size cabinet may also be wall-mounted.

10.7 Clearances

The following portion of Figure 5.1.2 illustrates metering clearance requirements:

Figure 10.7 – Metering Clearances Outdoors or in a Confined Area



CLEARANCES OUTDOORS OR IN A CONFINED AREA

Requirements:

1. The CT cabinet and meter should be mounted outside the building.
2. A clear work space is required in front of the cabinet. The hinged door, when open, shall not block ingress and egress, and shall open outward.
3. To minimize water drainage into the customer's equipment, Power Company equipment, transformers and vaults shall not be located higher than the CT cabinets.

10.8 Current Transformer Metering Conduit

The customer must provide conduit between the meter socket and the current transformer cabinet. When installing conduit, the following requirements shall be met:

Requirements (Meter within 4" to 12" of CT cabinet):

1. 1" minimum conduit of rigid steel or IMC.
2. Proper fittings and bushings to protect metering conductors.
3. Schedule 40 PVC / EMT may be allowed when a bonding lug is provided in both the CT cabinet and the meter base.

Requirements (Meter and CT cabinet greater than 12" apart):

This arrangement requires written Power Company approval prior to installation, and shall adhere to the following requirements:

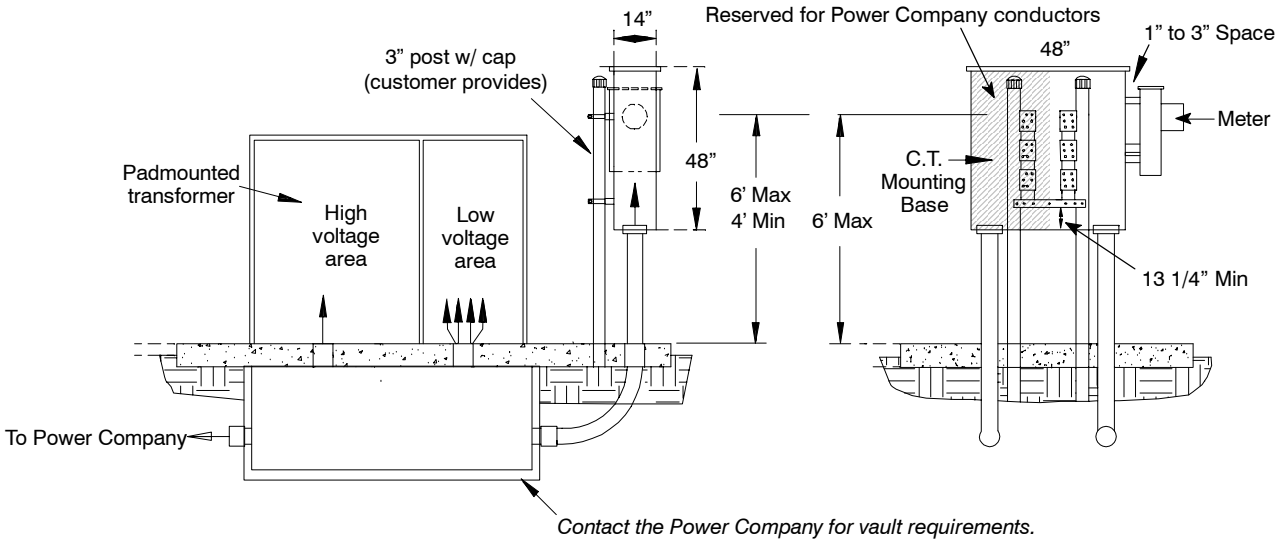
1. 1 $^1/_4$" minimum conduit.
2. Conduit runs may not have more than three bends totaling 270 degrees. No single bend greater than 90 degrees is allowed. Conduit runs must be 50 feet or less.
3. Pull lines are required in all conduit.
4. Removable conduit fittings shall have sealing provisions. (LB connectors are not allowed outside the enclosure without prior written Power Company approval.)

10.9 Current Transformer Metering for Free-Standing Installations

This section defines the additional metering requirements for free-standing current transformer metering installations typically used in irrigation fields.

Installing CT's inside the padmounted distribution transformer compartment is not allowed.

Figure 10.9 - Current Transformer Metering for Free-Standing Installations
For 600 Volt, 800 Amps Maximum



Additional Requirements:

1. The customer shall consult the Power Company prior to construction for installation-specific details and shall follow the guidelines defined in the figure above.
2. Refer to Section 6 for conduit requirements.

10.10 Current Transformer Enclosure Bonding

This section defines the bonding requirements for all CT enclosures.

Figure 10.10.1 – NEC-Accepted
Current Transformer Enclosure Bonding
For 600 Volt, 800 Amps Maximum

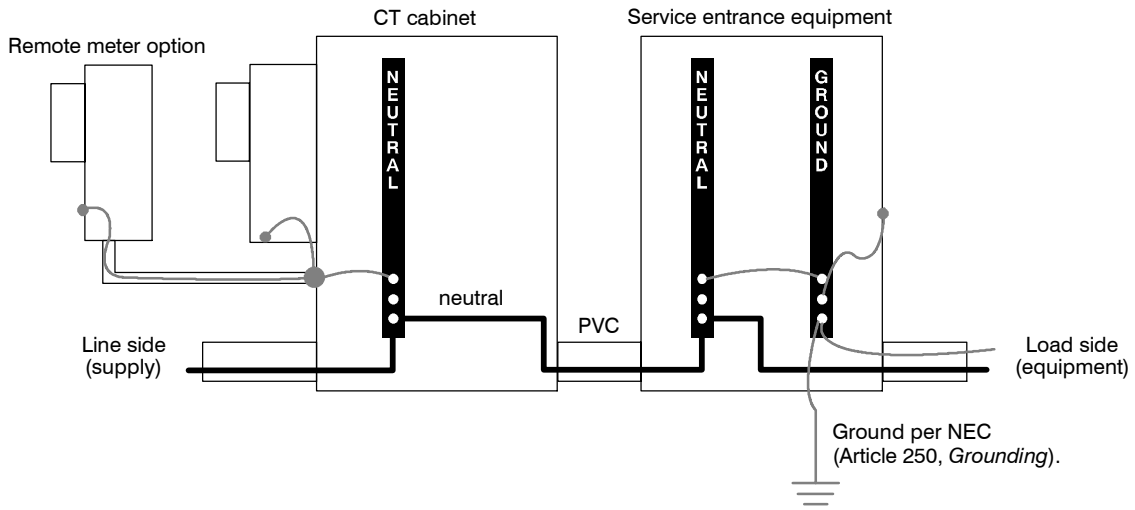
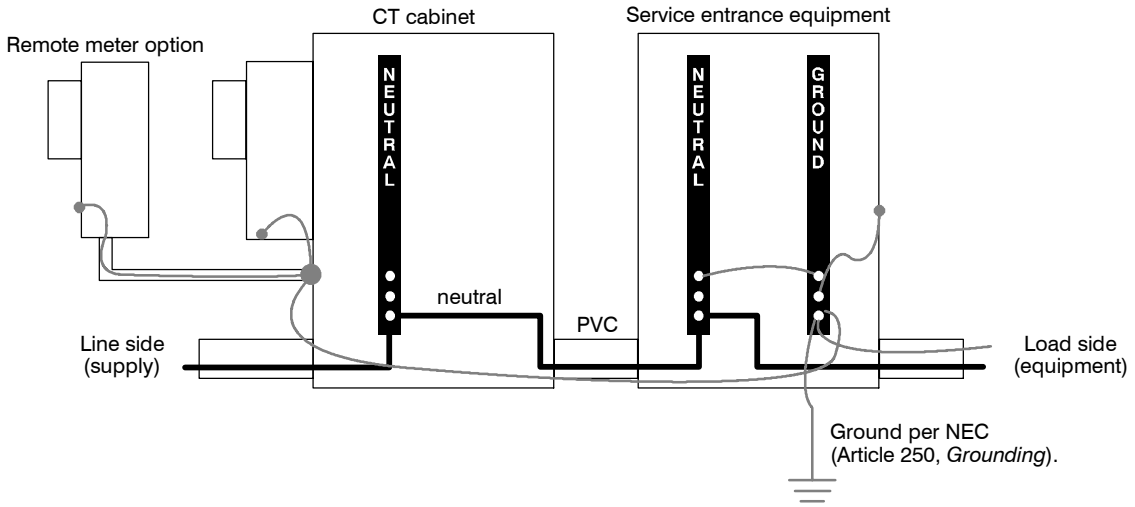


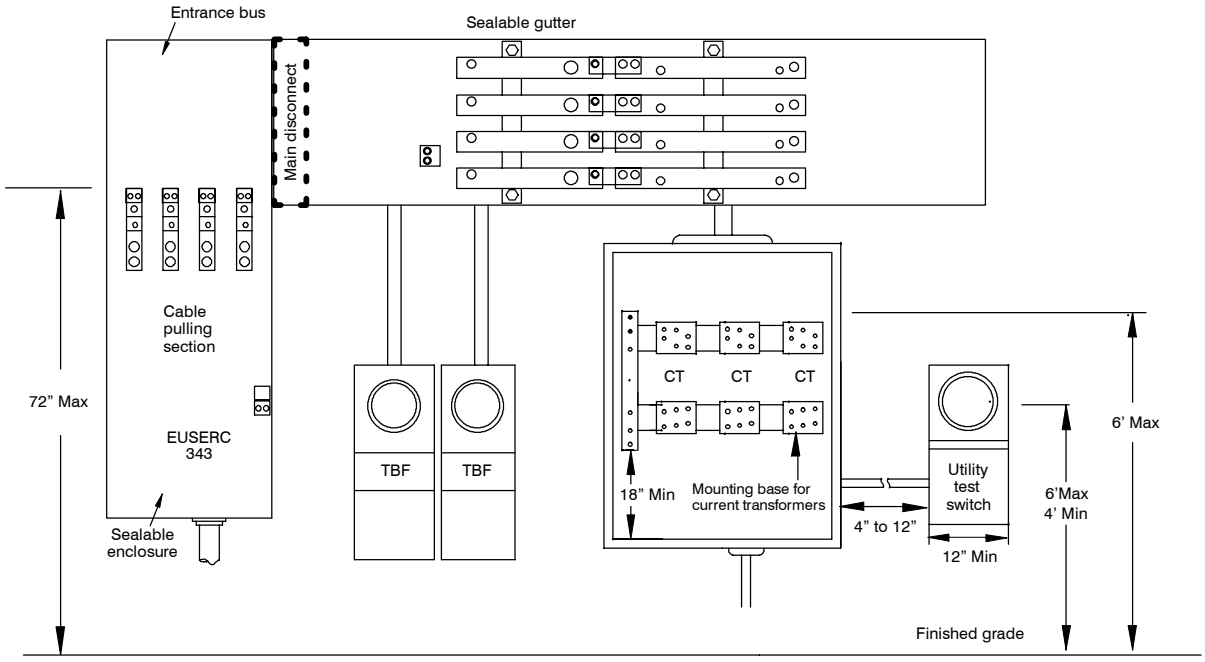
Figure 10.10.2 – Power Company-Preferred (for Oregon Only)
Current Transformer Enclosure Bonding
For 600 Volt, 800 Amps Maximum



10.11 Combination Self-Contained and Current Transformer Metering

Installations requiring both self-contained and current transformer metering services shall meet the requirements of both types of services as described in the previous section. Shown below is a wall-mounted equipment installation approved for this service. Switchboard combination units are also approved. Refer to Section 10.12, *Switchboard Metering* for requirements.

Figure 10.11 - Combination Current Transformer Compartment
(Direct-Connect, Wall-Mounted)



Requirements:

1. Bonding jumpers shall be used around knockouts.
2. Grounding and bonding per current NEC requirements is required (see Section 10.10).
3. The pull section shall be rated at the sum of the maximum service ampacities.
4. NEC requires a main disconnect when more than six services are connected. If an existing installation expands beyond six services, a main disconnect shall be installed.

10.12 Switchboard Metering

A EUSERC-approved switchboard metering section is required when the service entrance rating is greater than 800 amps. Switchboard metering may also be used for three-phase services over 200 amps and single-phase service over 400 amps.

Services greater than 800 amps shall be three-phase.

Switchboards shall be located outdoors unless prior written approval is received from the Power Company prior to installation. The Power Company reserves the right to refuse indoor installations.

Requirements:

1. The metering current transformers shall be located in the current transformer compartment.
2. For a single service, the meter and test switch shall be mounted outside the cabinet (remotely). Mounting the meter and test switch on the switchboard meter panel requires written approval by the Power Company.
3. Single-service metering compartments shall be located on the supply side of the main switch or breaker.
4. If written approval is obtained for an indoor installation, the service point shall be located no more than five feet inside the perimeter of the building.
5. Multiple metering services require meters to be mounted on the compartments' hinged meter panels.

The following table shows applicable EUSERC documents:

Table 10.12 – EUSERC Switchboard References

		EUSERC No.	Book Reference
SwitchBoard	Preferred *and* Alternate	325	10.12.1
Termination	Underground Service	345	10.12.5
	Overhead Service	348	10.12.6
Instrument Transformer compartment	0 to 1000 Amps	319 320	10.12.3.1, 10.12.3.2
	1001 to 3000 Amps	322	10.12.1
	Above 3000 Amps	324	10.12.1

The customer shall provide and install:

1. The switchboard enclosure, instrument transformer mounting base, bus bars, panels, and meter socket with provisions for a test switch.
2. Locking equipment for the metering enclosure allowing independent access by the Power Company.
3. A clear work space 78" high, 36" wide and 48" deep in front of distribution metering equipment as required by NEC.
4. A concrete mounting pad for the switchboard metering enclosure.

The Power Company will provide and install:

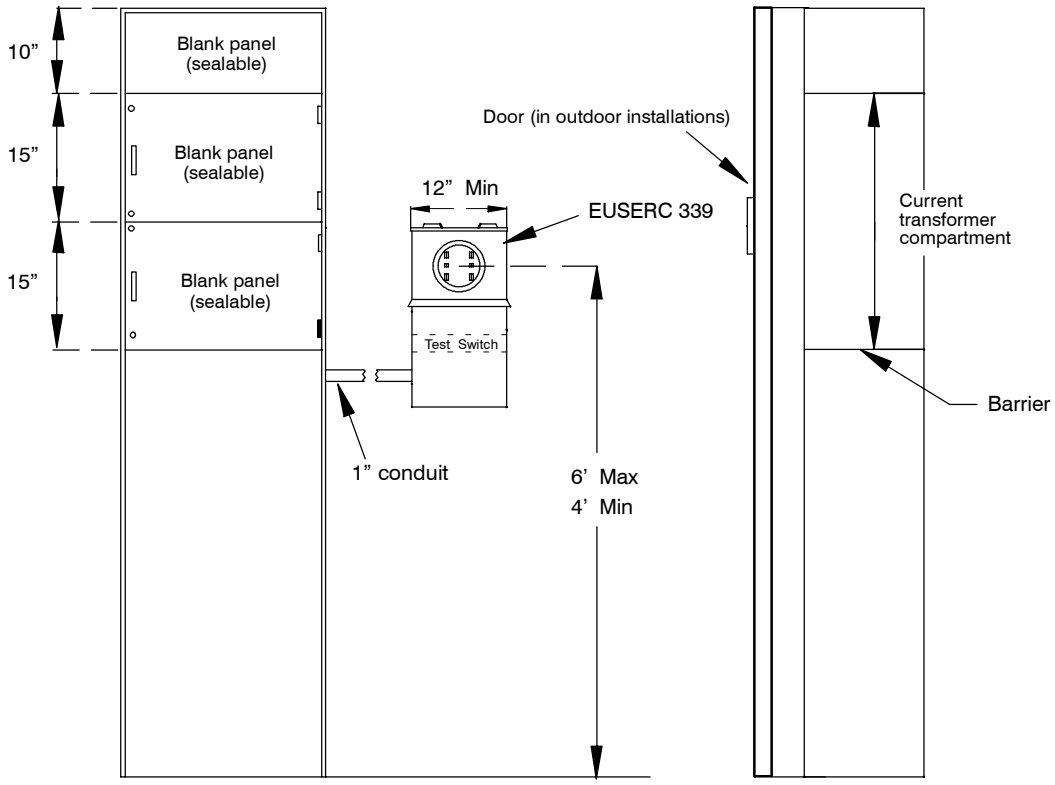
1. The meter
2. A meter test switch.
3. Instrument current transformers.

Note: The customer shall consult the Power Company for specifications on instrument transformers, secondary-side wiring of instrument transformers, and the meter test switch prior to ordering the metering enclosure. Enclosure drawings shall be provided to the Power Company for approval.

10.12.1 Switchboard with Remote Meter Socket, Preferred Method

Shown below is the preferred method for outdoor and indoor single-service switchboard metering installations.

Figure 10.12.1 – Remote Switchboard Metering Enclosure, Preferred Method
(for Indoor and Outdoor Applications)
EUSERC 325 and 354



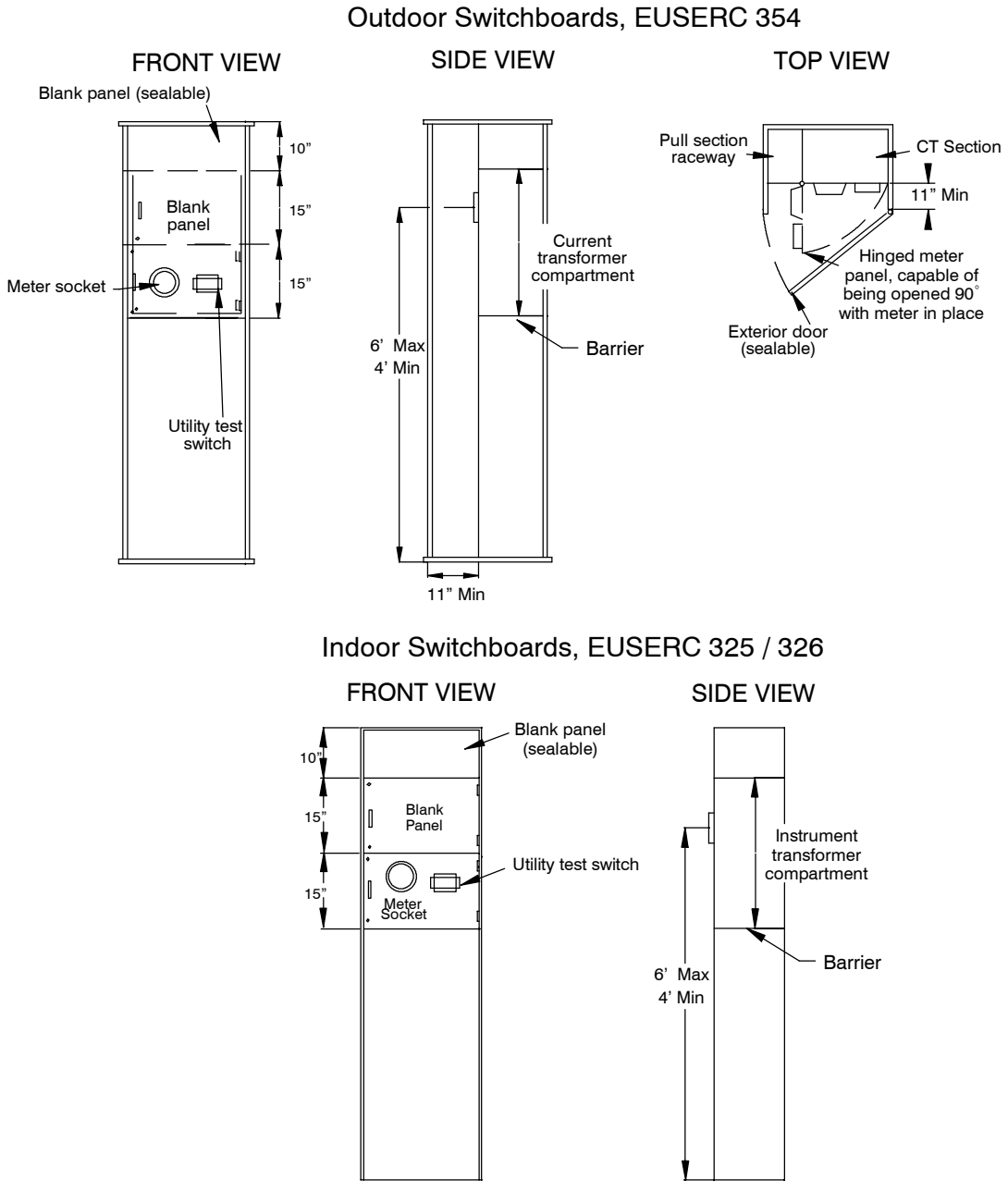
Requirements:

1. The service termination and metering equipment shall be located outdoors, within 50 feet of the transformer. If the Power Company allows the service termination to be located inside the building, the meter socket must be located outside the building.
2. The metering conduit in the switchboard section shall be PVC flex tubing and shall terminate in the current transformer compartment in front of the current transformers. Ninety-degree sweeps, LB’s or similar devices are not permitted inside the enclosure.
3. The customer must provide and install the remote meter socket, metering switchboard section and 1” minimum conduit for the metering secondary conductors. Refer to Section 10.8, *Current Transformer Metering Conduit*, for conduit requirements.

10.12.2 Switchboard with Meter Socket, Alternate Method

Shown below is the alternate method for single services in which the meter is mounted on the switchboard meter panel. This method, for both indoor and outdoor installations, is to be used only when a suitable remote meter location can not be found. This type of installation requires prior written approval by the Power Company.

Figure 10.12.2 – Switchboard Metering, Alternate Method



Additional Switchboard Requirements:

1. Exterior doors on outdoor switchboards shall be sealable and shall hold securely at a 90-degree minimum when open.
2. Meter panels shall not be hinged to a filler panel.
3. Prior written approval from the Power Company is required if the metering switchboard is to be installed indoors.
4. If an indoor switchboard installation is approved, the meter shall be located outdoors.

10.12.3 Current Transformer Compartment for Switchboards

A current transformer compartment is required for all switchboard enclosures.

EUSERC 319 (three-phase, three-wire) and EUSERC 320 (three-phase, three- and four-wire) are both approved for services up to 1000 amps. Since this requires bar-type CT's, the Power Company shall be contacted for approval prior to installation. The following three figures illustrate Power Company-approved switchboard equipment.

Figure 10.12.3.1 – Current Transformer Metering for Switchboards, 0–1000 Amps, Three-Phase, Three-Wire

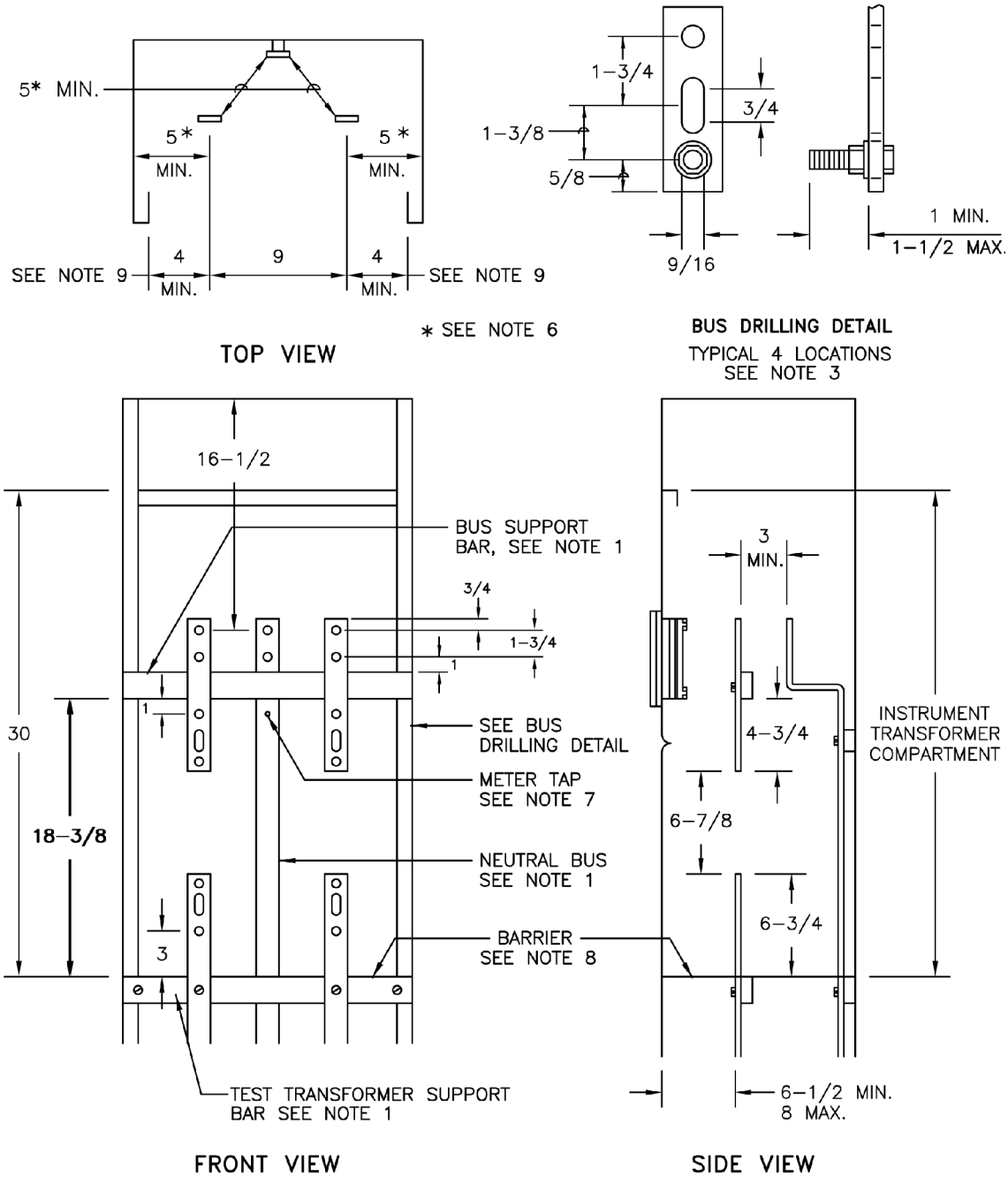


Figure 10.12.3.2 - Current Transformer Metering for Switchboards, 0-1000 Amps, Three-Phase, Three- and Four-Wire

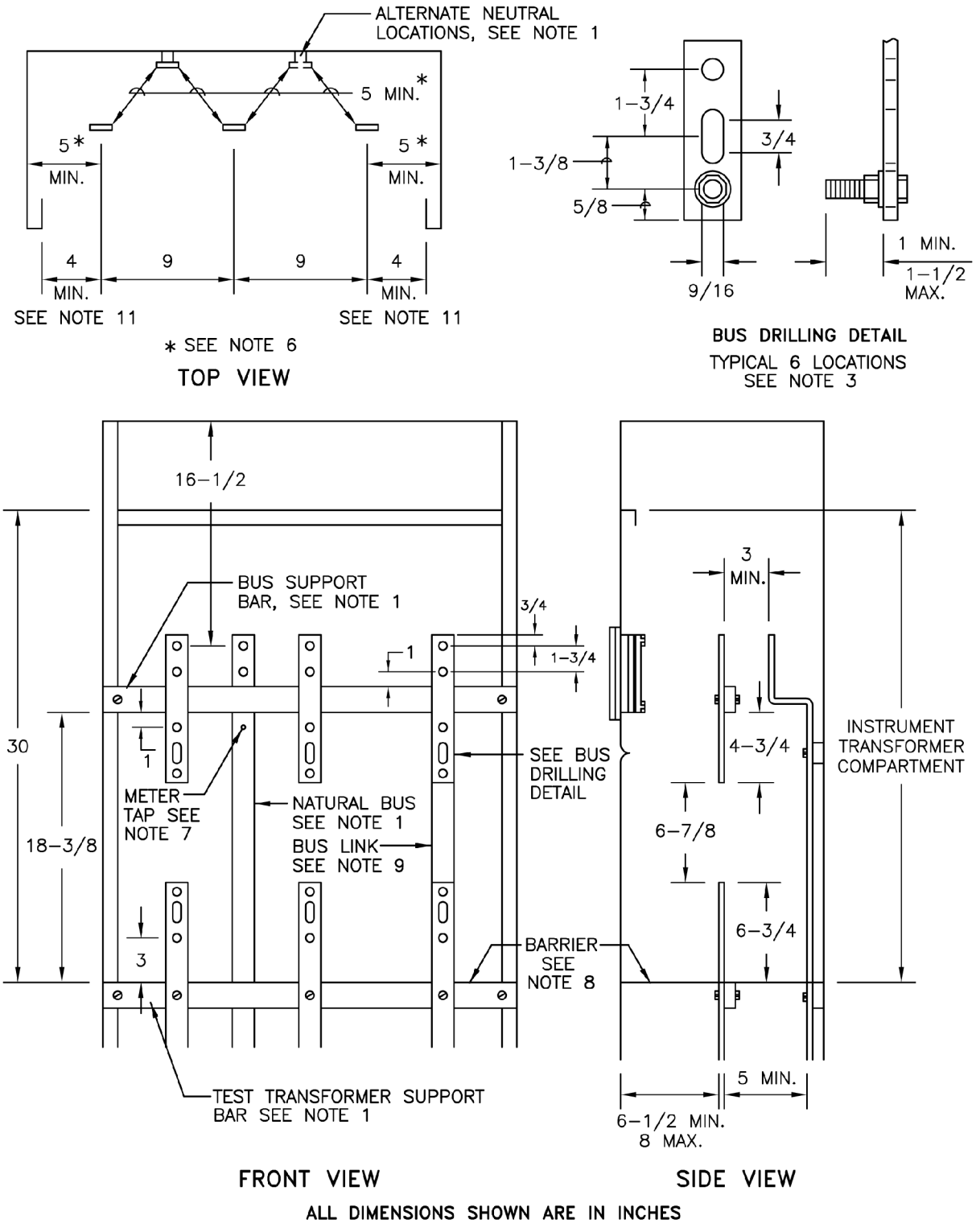
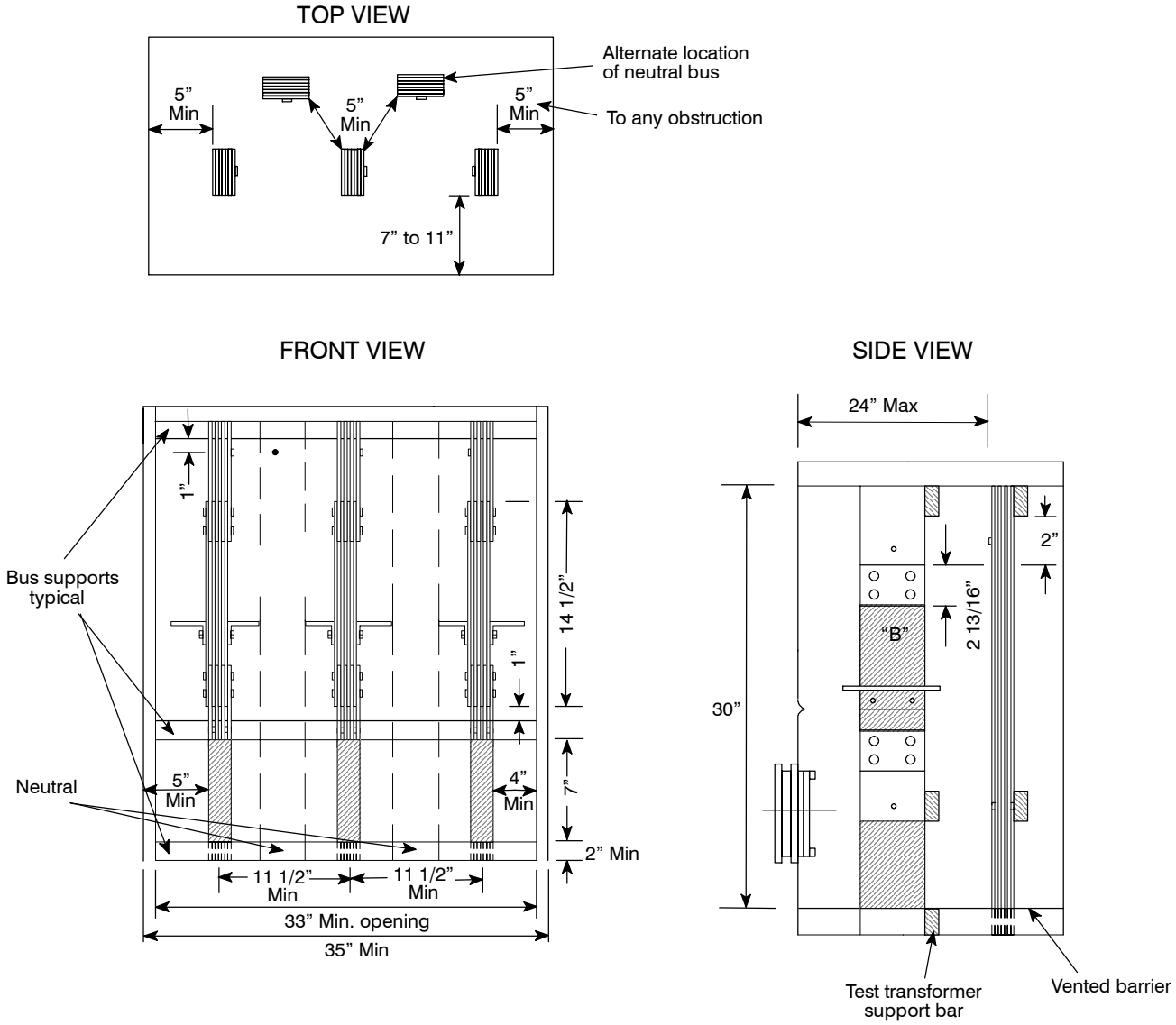


Figure 10.12.3.3 – Current Transformer Compartment for Switchboards 1001–3000 Amps, 0–600 Volts

Three-Phase, 4-Wire Service, EUSERC 322

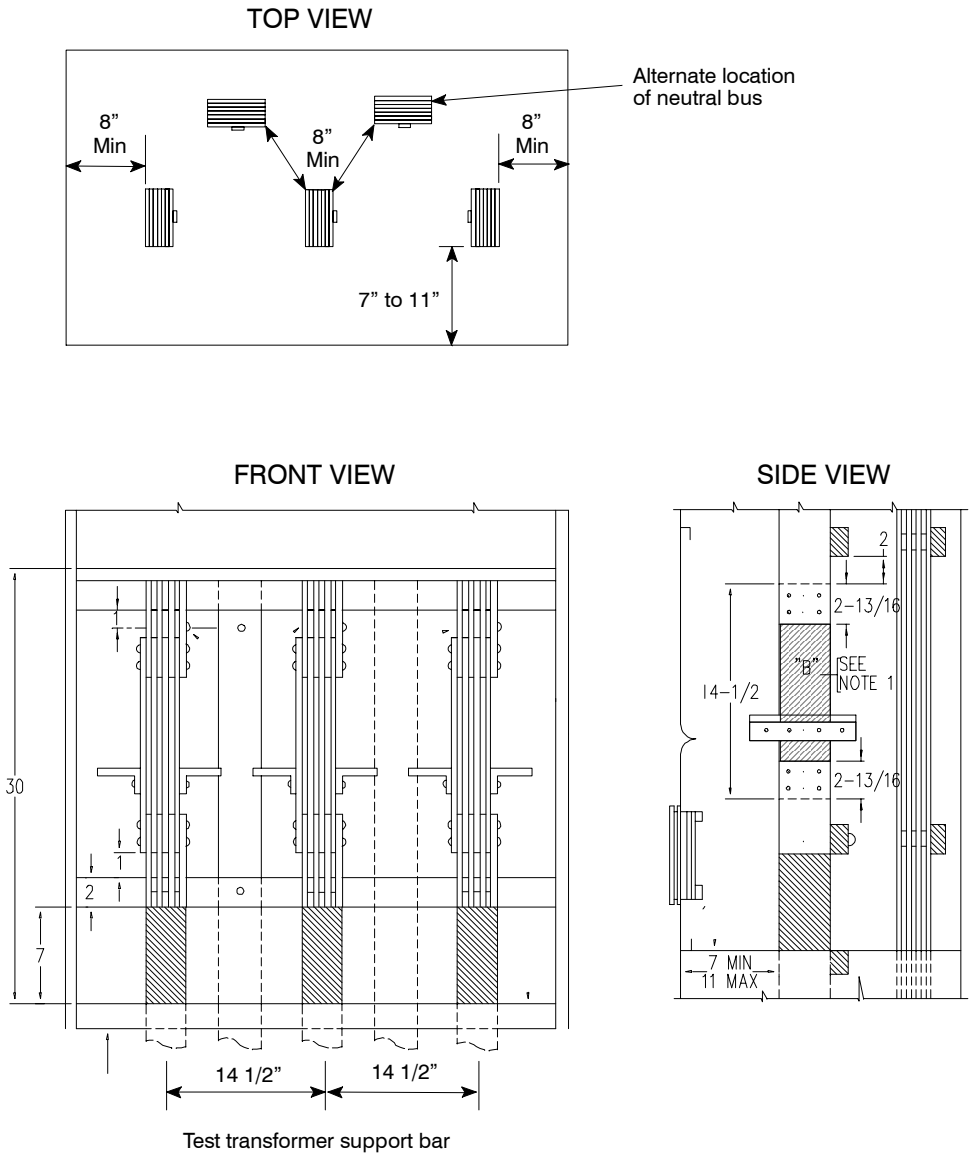


Requirements:

1. Busways shall remain in position when the removable section "B" is out.
2. The direction of the feed shall be set from the top or bottom. No other conductors shall pass through this compartment. When horizontal-cross busways supply the service section phase buses, a neutral bus bar extension shall be provided in the instrument transformer compartment above the lower CT bus support.

Figure 10.12.3.4 – Current Transformer Compartment for Switchboards 3001-Amps and Above, 0-600 Volts

Three-Phase, 4-Wire Service, EUSERC 324



Requirements:

1. Bus units may be supplied from the top or bottom.
2. Bus units shall be anchored such that busses will remain in position when section "B" is removed. Consult the Power Company for the use of busses larger than 5 inches. Bus supports shall be constructed of a continuous bar of insulating material.
3. When the compartment is supplied from horizontal cross-bussing, the bussing shall pass through the compartment, or in the sealed area above the compartment. No other conductors shall pass through the compartment.

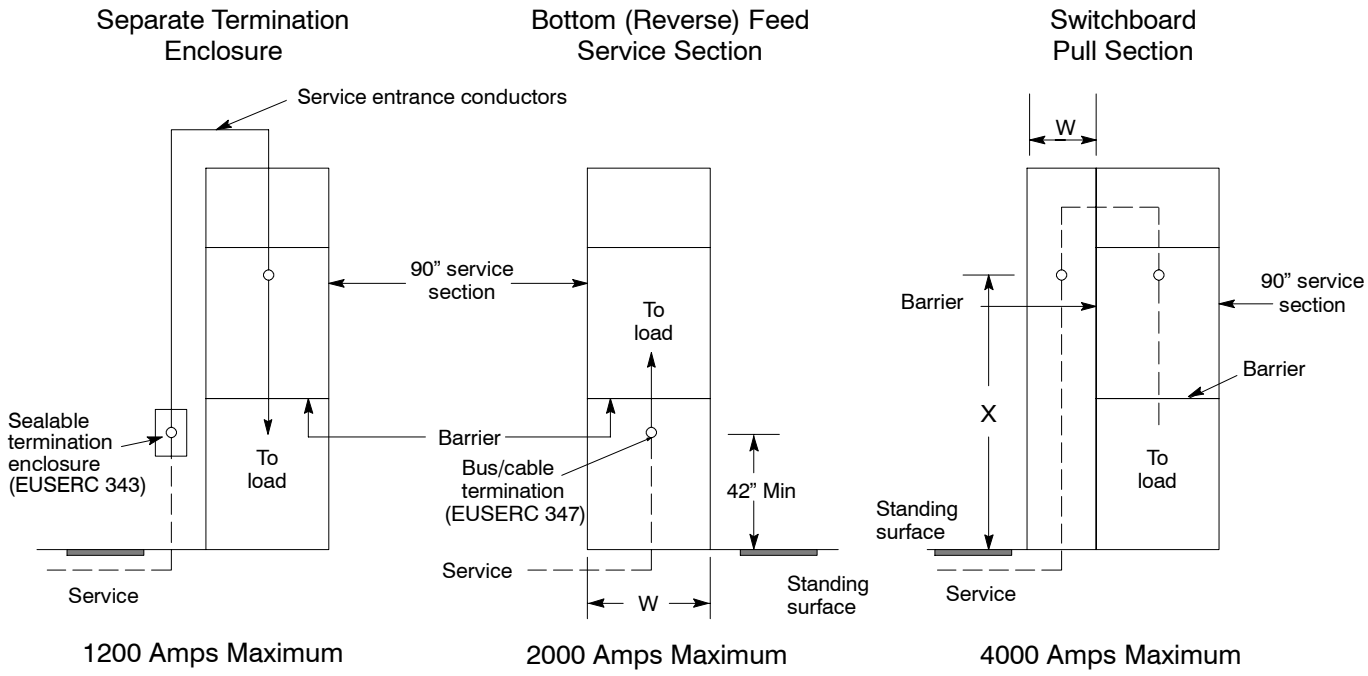
10.12.4 Termination Requirements for Switchboard Compartments:

1. For underground service, the Power Company will terminate the line side service conductors using Power Company-provided connectors on lug landings in the pull section.
2. Terminating bolts, provided by the customer, shall be secure and augmented by nuts, a flat washer and a spring washer. All parts shall be plated to prevent corrosion. Bus bars are required from the pull section into the service section.
3. Bonding shall meet current NEC requirements. Lugs for terminating the customer's ground wire (or other grounding conductors) shall be located outside the sealable section and shall be designed to permit the customer's neutral system to be readily isolated, when necessary, from the Power Company's neutral.
4. All removable panels and covers to compartments used for terminating or routing conductors shall have sealing provisions.
5. All pull and termination sections shall have full front access. All cover panels shall be removable and sealable, provided with two lifting handles, and limited to a maximum size of nine square feet.
6. Customer locking equipment for the metering enclosure must provide for independent access by the Power Company.

10.12.5 Underground Service Termination Requirements:

A separate termination enclosure, bottom-feed service section or switchboard pull section shall be provided for all switchboard underground services.

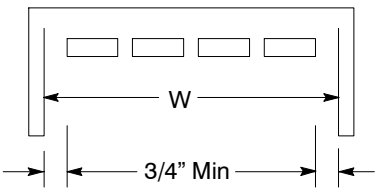
Figure 10.12.5 – Underground Service Termination Switchboard Service Section
400 to 4000 Amps, 0–600 Volts
EUSERC 345



Minimum Pull Section Dimensions

Switchboard Rating – Amps	Minimum Width "W"		"X" Minimum Dimension
	3–Wire	4–Wire	
400 – 800	24"	24"	42"
801 – 1200	24"	30"	42"
1201 – 2000	30"	35"	42"
2001 – 3000	–	42"	60"
3001 – 4000	–	48"	60"

Typical Top View



Additional Requirements:

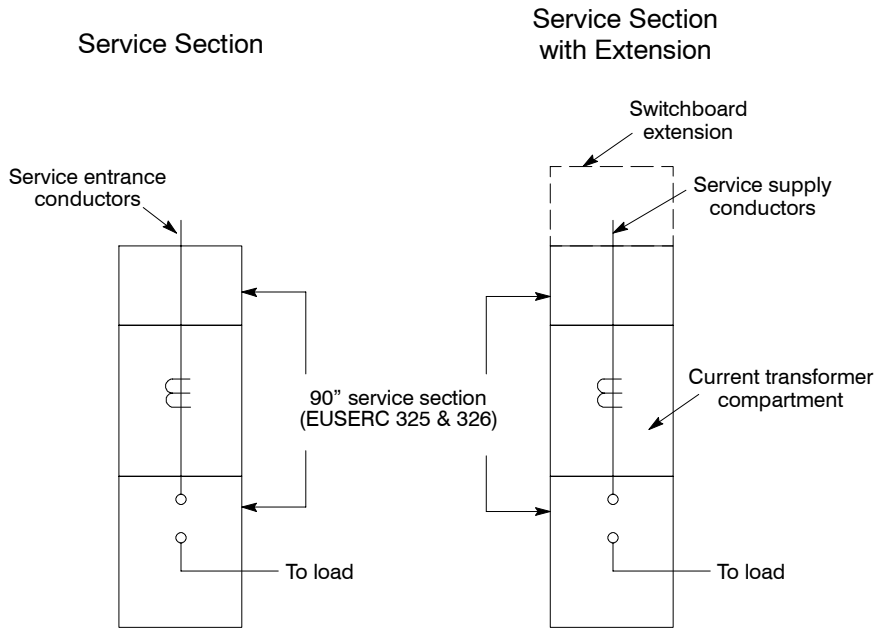
1. The customer shall provide the Power Company with a drawing of the proposed service equipment showing dimensions.
2. Bus bars, with provisions for termination lugs per EUSERC 347, are required from the pull section into the service section when the main switch is rated above 1000 amps, or when multiple metering is to be supplied.
3. Side or rear entry of the service cable into the pull section may require a greater dimension than that shown in the table.

10.12.6 Overhead Service Termination Requirements:

A switchboard service section or service section with extension shall be provided for all switchboard overhead services.

Figure 10.12.6 – Overhead Service Termination
Switchboard Service Section

0–600 Volts
EUSERC 348



Requirements:

1. The service entrance conductors, cable and bus bar are furnished and installed by the customer in the following manner:
   a. When the switchboards are served with bus bar conductors, the conductors shall enter through the top, side or back in the upper 10" section.
   b. When switchboards are served with cable conductors, the conductors shall only enter the top of the switchboard.
2. When conduits enter from the side or rear, an extension may be required.
3. The direction of feed is from top to bottom in the switchboard service section. Load conductors shall exit below the metering compartment and may not be routed back through the current transformer compartment in order to exit the service section.

10.13 Primary Voltage Service (Over 600 Volts)

10.13.1 General

High-voltage instrument transformers and transformer-rated meters are required for customers taking service at primary voltage under provisions of the Power Company's tariff. To establish a mutually satisfactory location for the service point and metering details, the customer shall consult the Power Company before construction begins.

The Power Company will provide primary voltage delivery to qualified customers directly, without transformation, from the high voltage or "primary" distribution system standard for the location in which service is requested, if the following conditions apply:

1. Service at primary voltage will not, in the Power Company's judgment, adversely affect the operation of the Power Company's distribution system or service to other customers.
2. The service supplied is distributed in a safe and reliable manner.

10.13.2 Customer Equipment

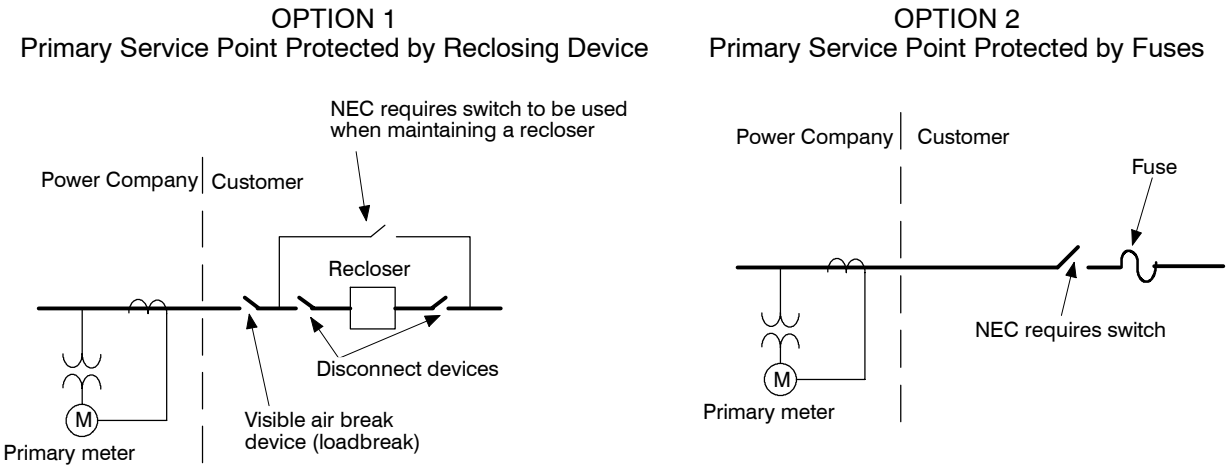
The customer receiving service at primary voltage may own poles, conductors, cables, transformers, switches, and associated protective devices in accordance with filed tariffs or special contracts.

The customer is responsible for the operation and maintenance of all customer-owned equipment. The Power Company does not maintain replacement stock for customer-owned equipment.

The Power Company will not accept some transformer configurations because of disruptive operating characteristics. The customer shall submit specifications for protective devices and transformers, including core types and winding configurations with associated wiring for written approval by the Power Company.

Contact the Power Company before installation for details and limitations.

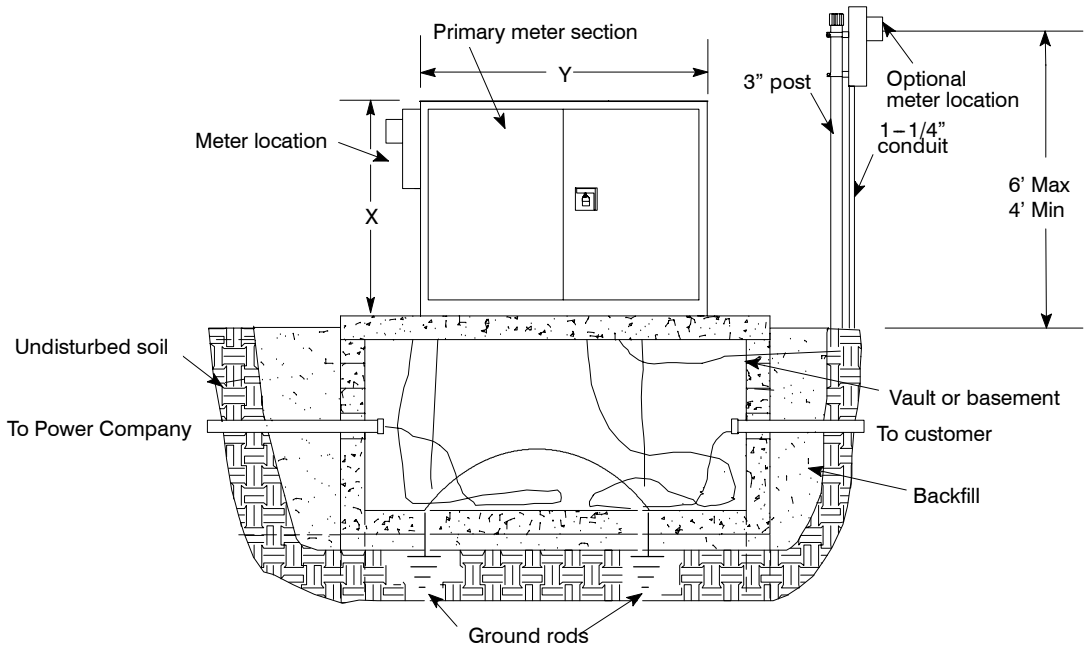
Figure 10.13.2 – Interconnection Diagrams, Primary Delivery



10.13.3 Power Company Equipment

The Power Company will normally provide the pole, or (at customer expense) a padmounted enclosure containing the primary metering equipment in accordance with the current filed Electric Service Regulations and tariff. In addition, the Power Company will normally provide a disconnecting means at or near the service point to separate the customer system from the Power Company's system. The Power Company will provide one span of overhead primary conductors from the primary metering pole to the customer's facility. When the service is underground, the service point is at the padmounted primary metering enclosure or the pole.

Figure 10.13.3 – Primary Metering Station for Underground 15 kV and 25 kV Services



Typical Metering Enclosure Dimensions

Amps	15 kV			25 kV		
	X	Y	W	X	Y	W
200	48"	72"	48"	54"	84"	54"
600	54"	84"	54"	54"	96"	54"

X=Height
Y= Width
W=Depth

Requirements:

1. The meter may be located on the metering station or on a post as shown (optional). The Power Company will supply the primary metering enclosure at the customer's expense, or the customer will provide the metering enclosure as approved by the Power Company.
2. The Power Company may require the customer to mount the meter socket enclosure on an optional customer-provided post. The location must be approved by the Power Company.
3. The vault or basement, its size and location must be approved by the Power Company.
4. The Power Company will provide the instrument current and voltage transformers, meter, and test switch.
5. The Power Company may require a disconnect means at the primary meter. Consult the Power Company and NEC for details.

10.14 Primary Metering Requiring Switchgear Enclosure

Prior to construction, the customer shall consult the Power Company regarding primary services greater than 600 V. Customers shall meet the requirements of EUSERC Section 400 when switchgear enclosures are required to meter medium voltage delivery services.

The customer shall submit approval drawings of the metering equipment to the Power Company prior to fabrication. Such drawings shall indicate the company's name, the job address, the contact address, and the telephone number of the manufacturer's representative.

The customer shall provide and install:

1. All necessary hardware per EUSERC Section 400.
2. A clear work space 78" high, 36" wide and 48" deep in front of distribution metering equipment (per current NEC requirements).
3. A concrete mounting pad for the switchgear metering enclosure, a minimum of 4" thick.

The Power Company will provide:

1. The meter
2. A meter test switch.
3. Instrument current transformers.
4. Instrument voltage transformers.

Note: The customer shall consult the Power Company for specifications on instrument transformers, the meter test switch and secondary-side wiring of instrument transformers prior to ordering the meter enclosure. Enclosure drawings shall be provided to the Power Company for approval prior to installation.

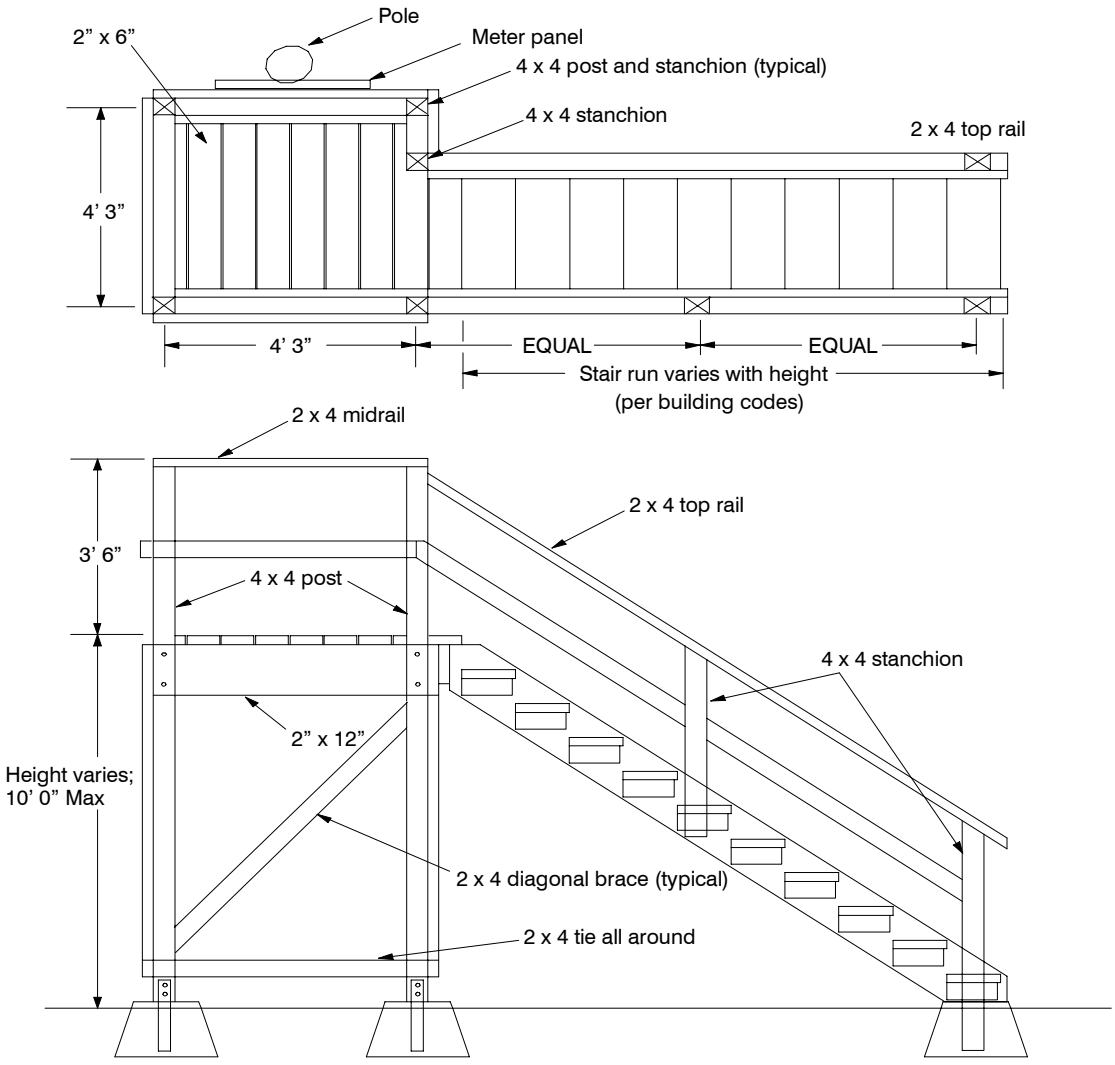
10.15 Primary Metering – Customer Owned Substation

Prior to construction design, the customer shall consult the Power Company.

The customer shall submit approval drawings of the metering equipment to the Power Company Meter Engineering Department prior to fabrication. Such drawings shall indicate the company's name, the job address, the contact address, and telephone number. The Power Company will specify proper metering equipment and placement according to current standards and specifications. Metering equipment installations will not be permitted without written permission from the Power Company.

10.16 Meter Access Platform in Flood Areas

Figure 10.16.1 – Meter Access Platform in Flood Areas
Customer–Installed



Requirements:

1. The Power Company will determine cases in which a platform is required, and the platform’s location. All platforms must be approved by The Power Company prior to installation.
2. All materials must be pressure-treated. The cost of construction shall be covered by the customer.
3. The customer shall provide permits and arrange land use associated with a meter access platform.
4. The customer shall maintain the platform and access stairs in a safe and operable manner.